SOUTH CAROLINA SEA GRANT CONSORTIUM

2002

Plan of Work

Results and Outcomes

July 1, 2003

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PROGRAM MANAGEMENT, ADMINISTRATION, AND LEADERSHIP

Goal 1: Maintain and enhance a management system and engaged administrative staff which supports the programmatic goals of the research, education and extension programs of the SCSGC.

1.1. Maintain the Consortium's extramural (non-state) funding at 2001 levels. (DeVoe)

- **The Consortium actually increased its non-state funding from $5,110,911 for 2001 (00-01) to $5,515,596 for 2002 (01-02), and increase of $404,685. See Attachment #1.**
- **The Consortium secured 19 extramural grants for programs that expand the agency's ability to respond to coastal and marine resource needs and opportunities. See Attachment #2.**

1.2. Recruit and hire a qualified individual to fill the vacant position of Assistant Director for Program Development. (DeVoe)

- **Due to significant state budget reductions over the last two years, and the possibility that federal Sea Grant funding will also be affected this year, the Consortium deferred recruitment and hiring of the Assistant Director position for now.**

1.3. Recruit and hire a qualified individual to fill the vacant position of Grants Assistant for Program Management (Knight)

- **Due to state budget cuts and possible Federal Sea Grant funding the position was not filled. The Consortium deferred the recruitment and hiring of the Grants Assistant position until the budget picture improves.**

1.4. Expand staff support for the Consortium's Marine Educator from quarter-time to half-time. (DeVoe, Knight)

- **Additional support for the Consortium's Marine Educator was obtained through the recently awarded NSF grant establishing the Southeast Center for Ocean Sciences Education Excellence. She now receives 50% of her support from this grant.**

1.5. Encourage Consortium and Extension staff to pursue leadership positions with pertinent organizations and associations at the state, regional, and national levels. (DeVoe, Knight, Bacon, Blackwell)

- **The South Carolina Sea Grant Consortium staff has played key leadership roles in organizations, professional societies, and activities that advance the mission of the Consortium and enable it to better serve the needs of its constituencies. See Attachment #3 for list of leadership activities of the Executive Director and the Consortium staff.**

1.6. Process proposals to assure grant awards are received in a timely manner, reviews, signs and returns official documents to granting agencies and issues sub awards to research institutions. (Knight)

- **All proposals were processed on time. Grant awards were held up due to national budget continuing resolutions until February 2003 for FY03 funding. The Consortium's omnibus budget with a start date of 03/01/03 was delayed therefore delaying sub awards to research institutions.**

1.7. Handle extension requests of sub-awards as soon as received to allow for a fluid continuation of research, extension, and communication project and program objectives. (Knight)

- **All extension requests were handled in a timely manner and where approval did not lie solely with the Consortium; requests for extensions were forwarded via the Consortium to the proper authorizing entity.**

1.8. Assure SCSGC accounting procedures and equipment inventories are current and meet or exceed state, federal, and local policies and regulations. (Knight)

- **Accounting procedures were updated and streamlined and equipment inventories were in the process of being updated to meet the recommendations of the state auditor's office.**

1.9. Ensure that the Consortium's accounting and administrative procedures meet or exceed the requirements of the state's single agency audit for FY01. (Knight)

- **The Consortium was audited for FY01 and there were no significant findings. The Consortium also was audited for the first time under the A-133 single audit act for FY02 and there were no significant findings.**

1.10. Maintain communications with SCSGC liaisons at colleges and universities to process and administer grant sub-award documents in a timely manner. (Knight)

- **The Consortium needs to arrange a liaison meeting to discuss changes to accounting procedures such as GASB 34 and to NOAA grants management procedures. A meeting is usually held once a year and the Consortium hopes to institute the annual meeting again in FY03.**

1.11. Foster professional development goals of the administrative staff through attendance at workshops, seminars and other meetings to enhance their knowledge of practices and procedures of federal, state, and local governments. (Knight)

- **The administrative staff has attended meetings and workshops to enhance their work performance and to ensure that professional, administrative, and accounting goals are being met.**

1.12. During 2001-2002, the Consortium's Management Information System (CMIS) was converted from an outdated database system running on Unisys equipment and a text-oriented database software package called TXBASE 2.0, to a Windows-based platform utilizing Microsoft Access as its database. CMIS addresses one of the Consortium's major management objectives – the evaluation of organizational performance against goals and standards. Ultimately, this will permit the Consortium's Management Information System to become more fully Web-based and

interactive with Sea Grant researchers and other stakeholders. In the immediate future, the new Access database will be further refined to facilitate querying as well as generating useful management reports. (Dwyer)

- **Ongoing; Access database training scheduled for April 10, 2003. Consultant is aware of our information needs and is working on developing the Access database to best serve those needs.**

1.13. Enter, within 30 days of receipt, annual and final project reports into the CMIS database as edited. (Dunmeyer)

- **The project reports are being entered on a timely and continuing basis as edited.**

1.14. To reflect significant changes in recent years in the way we do business, the SC Sea Grant Consortium's "External Procedures Guide" will be significantly revised and then distributed to appropriate constituencies early in 1st Q 2003. (Dwyer)

- **Delayed until 2nd Quarter until plans for the Consortium's FY04-06 Biennial Proposal are developed and further discussions are held on how we plan to do business with our constituencies via the Internet and our Web site.**

1.15. Continue to update the Consortium's Web site to further facilitate the agency's goal to make the proposal solicitation and review process with our member institutions more Web-based. (Dwyer)

- **Delayed until 2nd Quarter until plans for the Consortium's FY04-06 Biennial Proposal are developed and further discussions are held on how we plan to do business with our constituencies via the Internet and our Web site.**

1.16. In the spring 2003, the biennial "Omnibus" request for proposals will be issued, reflecting the strategic goals, objectives, and research and education priorities that will be determined by the strategic planning process occurring during the fall and winter of 2002-2003. The Consortium's RFP is designed to solicit those research proposals most closely aligned with our strategic plan. Our goal is to generate 50 concept letters. (Dwyer)

- **This is on-going and the process is presently on-target. A pre-announcement was sent to all of our member institutions, liaisons, grants officers, researchers and other constituencies by means of email and USPS postcards on March 13, 2003.**

1.17. Conduct at least two site visits in 2002 to monitor investigator process as well as advance the agency's knowledge and understanding of the research projects we support and may fund in the future. This process also allows us to stay current with research issues and advances in technologies, which address management of South Carolina's coastal resources. (Dwyer)

- **Conducted site visits at the University of South Carolina (Dr. Laszlo Marton) to learn about their phytoremediation work and see their laboratory and greenhouse set up.**
- **Visited some of the USGS Coastal Erosion principal investigators while attending a SEERS meeting at Coastal Carolina University (Drs. Scott Harris and Eric Wright).**
- **Also toured the new Hollings Marine Laboratory with Dr. Fred Holland.**

1.18. Integrate and coordinate the program management, planning and reporting processes of the SCSGEP institutional partners, SCSGC and CES. (Bacon)

1.18.1. Re-locate the SCSGEP leader position within the Clemson administrative structure. (Bacon)

- **Clemson Extension leadership at the director/ assistant director level has indicated that the Sea Grant Extension program leader position will be administratively re-located from within the PRTM Department to the Institute for Economic and Community Development. This did not take place in 2002, but is still planned.**

1.18.2. Establish a single planning and reporting document that meets the needs of both SCSGC and CES for SCSGEP reporting. (Bacon)

- **The Clemson University Faculty Activity System (FAS) is used by all faculty members, including Sea Grant Extension staff, to report on annual work activity. This system is now being used by Sea Grant Extension as its primary reporting tool for annual State Progress Reports and Sea Grant Accomplishment reporting.**

1.19. Maintain SCSGEP specialist staffing levels. (Bacon)

1.19.1. Fill the vacancy in the Coastal Recreation and Tourism sub-program.

- **An advisory panel was convened in August 2002 to re-examine program direction and, if necessary, re-work the position description in preparation for this position. However, due to significant State budget shortfalls, leading to deep agency cuts, our partner institution, Clemson Extension, was unable to provide state matching funds needed to hire a CRT specialist in 2002. The Consortium and the Sea Grant Extension program continue to explore options for filling the position in 2003.**

1.19.2. Fill the vacancy in the Coastal Hazards sub-program.

- **In 2002, a search committee was formed, applications solicited, finalists selected and interviews scheduled before the SCSGC state partner, Clemson Extension, indicated that due to continuing cuts in State funding, they would be unable to support this position until July 1, 2002 at the earliest. Continuing State budget shortfalls make this estimate highly optimistic. The Consortium Executive Director and Sea Grant Extension program leader continue to explore alternative options to re-fill this position in 2003.**

1.19.3. Contract with SCDNR for temporary Fisheries Extension Specialists to represent the SCSGEP in South Atlantic Regional Fisheries Extension projects.

- **SCDNR staff (M. Bell and P. Wendt) were contracted to represent S.C. Sea Grant on regional working groups in the Sea Grant Extension FY 2002 Fishery Extension Enhancement projects on Marine Protected Areas and Essential Fish Habitat.**

1.20. Represent the SCSGEP in national and regional Sea Grant Extension network activities. (Bacon)

1.20.1 Serve on the Executive Committee of the ASGEPL.
- **Program Leader completed my three-year term on the ASGEPL Executive Committee as Chair Elect, Chair and Past Chair in 2002.**
- **Chaired the Nominating Committee and conducted the election for Assembly officers.**

1.20.2 Serve on the program planning of the annual ASGEPL meeting.
- **Planning committee member for the 2002 ASGEPL meeting in Baton Rouge, Louisiana.**

1.20.3 Represent the ASGEPL as liaison with the SG National Review Panel.
- **In 2002, as Past Chair, represented the Assembly as liaison to the Sea Grant National Review Panel.**

1.21 Design, program, and maintain the Consortium's Web site. (Snow)

1.21.1 Update SCSGC Web site twelve times yearly.
- **Site updated approximately 24 times.**

1.21.2 Produce SCSCG Web reports twelve times yearly.
- **Produced 12 reports.**

1.21.3 Chairs agency Web core group meetings twelve times yearly.
- **Chaired 12 Web core meetings.**

1.21.4 Stay abreast of new technologies by completing two training courses.
- **Completed a 6-part lesson and a tutorial using FireWorks software.**
- **Completed a 5 week on-line WebAim Accessibility Training course.**

1.21.5 Join two Web-related professional organizations.
- **Joined S.C. Government Webmaster's Association.**
- **Joined the Sea Grant Network Webmaster's Association.**

1.21.6 Attend four Web-related meetings or workshops
- **Attended a demonstration given by Wisconsin Sea Grant on their new data-base driven system, iPro.**
- **Attended the first S.C. Government Webmaster's Association meeting in Columbia. The topic was strategic goals for a statewide information architecture framework to help reduce redundancies and improve collaboration.**
- **Attended the SC Government Webmaster's Association meeting and is on the design committee. Have been asked to design the look and structure of their site.**
- **Attended a general meeting of the SC Government Webmaster' Association and was elected a Director at Large.**
- **Attended a board meeting of the SC Government Webmaster' Association.**

1.21.7 Create a Consortium-related Web site for the NEMO program.
- **Designed and posted SCNEMO Web site in September 2002.**

1.22 Design and produce graphic materials for the Consortium. (Blackwell, Snow)

1.22.1 Design and produce 50 Consortium publications.
- **Produced 53 Consortium publications. (See Attachment #4)**

1.22.2 Design and produce three specialty items for events such as Beach Sweep/River Sweep and ICSR.
- **Produced Beach Sweep/River Sweep t-shirts.**
- **Produced Beach Sweep/River Sweep frisbies.**
- **Produced Beach Sweep/River Sweep pocket koozies.**
- **Produced hats for the International Conference on Shellfish Restoration**
- **Produced koozies for the International Conference on Shellfish Restoration**

1.22.3 Design and produce five display items such as award plaques and updated panels on Consortium displays.
- **Designed and produced two posters for display at the reception for the U.S. Commission on Ocean Policy meeting in Charleston SC.**
- **Produced one glass award for the 2001 South Carolina Environmental Awareness Award.**
- **Produced two award plaques for the Sea Grant Association.**
- **Produced nine award plaques for the Sea Grant Association.**

1.22.4 Design three new graphic identities such as logos, banners, and graphic elements for Consortium-related materials.
- **Designed graphic identity for the Eastern United States Interstate Shellfish Seed Transport Workshop.**
- **Designed fact sheet templates for the Sea Grant Association.**
- **As part of the Consortium's new identity, designed pocket folders to match recent brochure.**

1.23 Respond to unanticipated priority projects and needs, when appropriate. (DeVoe, Knight, Dwyer, Bacon, Blackwell)
- **Assistance to the Shrimping Industry. The Consortium has actively participated with the South Carolina shrimping industry in providing technical and administrative assistance related to the provision of FY03 federal funds for economic assistance, marketing, and strategic planning.**
- **Eastern United States Interstate Shellfish Seed Transport Workshop. Designed registration form, agenda, nametags, abstract booklet, and placed electronic file of booklet on the agency's Web site.**
- **Earth & Sky. As part of a national project, S.C. Sea Grant worked with "Earth & Sky" a national syndicated educational radio program to produce a South Carolina oyster restoration spot. S.C. Department of Natural Resources researcher and project leader Loren Coen was interviewed by Earth & Sky producers. The show was aired May 22, 2002 and was featured on their Web site. The tagline at the end of the spot was "Special thanks to the South Carolina Sea Grant – science serving America's coasts." Earth & Sky broadcasts to 904 affiliates nationwide (five in South Carolina).**
- **Stormwater BMP Academy. Designed and produced registration brochure and notebook covers and spines.**

COASTAL OCEAN PROCESSES AND DYNAMICS

Goal 2: Identify and understand the processes dominating the coastal ocean of the South Atlantic Bight as they affect coastal processes, pollution of the coastal zone, fisheries dynamics, and mineral resources management, and are influenced by global climate change.

2.1. Coastal erosion is a significant issue affecting the economies of coastal communities in South Carolina. The overall goal of the South Carolina/Georgia Coastal Erosion Study is to enable planners to determine sediment budgets for defined sections of coastline using predictive models based upon the composite efforts of the various components of the study. The investigative strategy will quantify historical shoreline changes and identify critical erosion areas; determine geologic frameworks; and calculate sediment volumes and transport rates within areas of principal concern. The present phase of the study has been expanded to include remaining portions of the South Carolina coast and portions of the Georgia coastline. (DeVoe et al: R/GS-2)

2.1.1. Provide useful, accurate, well-documented digital data sets to principal investigators in the coastal erosion study and the general public. Shoreline and coastal profile data will be synthesized into a common, programmatically defined Geographic Information System. (Harris and Wright)

- ***Generate shoreline data from 1998 SC OCRM aerial photography*. The shorelines have been digitized directly from the photography, and will be available online August 15, 2001.**
- ***Compile shoreline profile data (long-profile surveys) for South Carolina from existing BERM data sets.* The composition of the datasets has been defined for dispersal of the profile data, and they will be available on the Web site.**
- ***Document critical areas of erosion based on existing shoreline change data for the study region in South Carolina*. Shoreline change trends, risk categorization, shoreline profile data, and framework geology information are being compiled and related to identify critical areas of erosion for focus into the second year. The Anders *et al.* (1990) shoreline change maps are nearly completely digitized and will be available by August 15th on the Web site.**
- ***Identify and hire a research associate to fill the data distribution and dissemination needs for the data to be collected in Phase II.* This task has not been completed. An individual will be more useful over the next year to maintain and update the database after the Year 1 data and products from other PIs are available for incorporation.**
- ***Create an accessible internet database of data collected during the first year*. A 116 Gb SnapServer has been placed on line and is being maintained to support data compilation needs. http://maps.ac.coastal.edu/ will be the data server for ArcIMS and as a placement region for the PI's data and metadata for the project. Once security issues are cleared, ftp, NFS, and http services will be available at this site.**

2.1.2. Determine the alongshore stratigraphy and examine the timing of spit development of the North Island barrier complex. (Wright *et al.*)

- ***Ground Penetrating Radar (GPR)*: Approximately 6 track-line kilometers of GPR data was collected on the spit complex during March 10-14, 2001 (Figure**

1). To best determine former inlet locations and possible shoreline positions as related to changes in framework architecture, data was collected along a 3.2 km, shore-parallel transect extending from the northern end of the spit complex southward to the historically mapped 1850 shoreline (Anders et al, 1990). This transect was located along the landward portion of the coastline dune system where the only continuous path along the spit was possible. To assist with vibracore stratigraphy, data was collected along a 0.15 km shore-parallel transect extending north from the 1850 shoreline. Data was also collected across the island along the 1850 coastline, along the interpreted coastline located immediately north of the lighthouse and half-way along an interpreted coastline near the northern end of the main spit complex. During a partial weather day, an additional GPR transect was collected across Waites Island, where previous vibracore transects already exist. The shore-parallel transect collected within the dune system is currently being corrected for changes in elevation using GPS data. Later in the summer, GPR collection will be completed along the "northern" transect and along the vibracore transects normal to "lighthouse" and "northern" transects.

- ***Vibracoring*: Vibracores were collected at 14 locations along the spit complex from May 18-27, 2001. Vibracore locations were collected at the center of the spit to try best to capture the position of the recurved coastline and to provide potential of organic deposits for radiocarbon dating. Lows within the dune topography were selected to increase stratigraphic information. To improve confidence in the luminescence age estimates and potential identification of coastlines, vibracore locations along short transects were established at the 1850, "lighthouse," and "northern" transects, as well as the north end of the spit complex. Additional vibracore locations were established between these points and within the area of the interpreted channel located near the north end of the spit complex. In many locations the same hole was re-occupied to try gain deeper information.**
- **Vibracore penetration ranged from 2.2-5.7 m, generally between 3-4 m depth. At each location, the cores at least penetrated into the bedded shell fragments of the split platform. While these depths are certainly less than desired, the penetration into the platform will allow for luminescence dating to be completed. Over half the collected vibracores have currently been split, photographed and described. Grain size analysis is currently being completed on the split halves and selected samples are being sent off for luminescence dating. Vibracore descriptions and sedimentological analysis will be completed by the end of the summer.**
- ***Augering*: Augering was attempted at many locations and on different environments on the spit platform was and not found to be an effective reconnaissance tool due to shallow "running" sands.**

2.1.3. Define the distribution and character of near-surface geologic strata at the active coast and develop a bibliography of references related to the geology of the Grand Strand region of South Carolina's coast. (Harris and Katuna)

- ***Bibliography.* A bibliography of references relating to the geology of the Grand Strand and nearby areas is being compiled. At present, over 130 published and unpublished references have been photocopied and tabulated. These papers pertain to the geomorphology of the lower coastal plain of South Carolina, the Quaternary, Lower Tertiary and Upper Cretaceous stratigraphy of the lower coastal plain in the vicinity of the Cape Fear Arch, and to hardbottom-dominated areas of the continental shelf which are present off the coast of southern North Carolina and the Grand Strand.**

Publications, theses, and dissertations will be continually added to the reference list as they are obtained.

- ***Existing Subsurface Data.*** **Water well files in the South Carolina Department of Natural Resources - Land, Water and Conservation Division office were examined and photocopied in two trips to Columbia in May 2001. Files that contained gamma or geologic logs for wells, that were located within about 6 miles of the coasts of Georgetown and Horry Counties, were copied. Gamma logs from wells in coastal areas typically displayed a well-defined spike in the top 100 feet of the hole that was interpreted to reflect the unconformity at the base of the Quatemary section. It was hoped that the auger or geoprobe drilling could confirm this. Few of the wells had actual geologic logs, and none had interpretive stratigraphic information. The locations of the 90 wells that had usable logs on file were put into an ArcView shape file. Additional subsurface data was obtained from the files of the late Dr. Donald Colquhoun that are in the possession of the College of Charleston Geology Department. Colquhoun and his co-workers drilled hundreds of shallow auger holes in the South Carolina coastal plain in the 1960's, and the lithologic logs for many of these holes are present in the files. Over fifty of these holes were located in or near the study area. The detailed sample descriptions and stratigraphic interpretations for these holes will be a significant resource in this study.**
- ***Geoprobe Drilling.*** **Sixteen geoprobe holes were drilled with Gregg Insitu as contractor, during the last week of June 2001. A small track-mounted rig built by Marl Technologies was utilized, and core samples were acquired by pushing or hammering a 4 foot core barrel, that contained a 2" diameter plastic tube, into the unconsolidated sediments. The plastic tube with the recovered sample was removed after every 4-foot run and labeled with the appropriate footage. If recovery was less than 100% the empty part of the tube was cut off and the remaining length was capped to prevent movement of the sediment within the tube. Typically a grab sample was also taken from the end of the core barrel at the end of each run. The holes were generally drilled until they encountered a layer they could not hammer through.**

2.1.4. Elucidate the roles inner-shelf morphology and geologic framework have on the evolution of the northern South Carolina coast, as well improve understanding of mobile sediments in order to determine sediment budgets for realistic long-term beach renourishment plans for the state's shoreline. Will also assist state's mapping efforts for important biological hard-bottom habitats. (Gayes *et al.*)

- **A geophysical cruise was completed during April 28-May 18, 2001 to extend the Regional USGS Inner Shelf Framework across the shoreface to the beach (Objective 1/Task 1). The cruise was conducted aboard CCU's vessel Coastal II and utilized the USGS side scan and Submetrix sonar system and Driscoll's XSTAR Chirp subbottom profiler. The Coastal II was modified to deploy all sensors simultaneously in shallow water. The cruise was a successful and cooperative effort involving all three PIs and many additional CCU and USGS staff. Data collected each day was provided to a shore-based data processing group (Danforth and Denny), set up at CMWS, which processes and compiled side scan, submetrix and chirp data. The finalized data products were compiled in a GIS by USGS that has the following coverages: Tracklines, Side Scan Mosaic, Bathymetry, and Hot links to Seismic Profiles (JPEG format). This is being merged with the USGS inner shelf imagery and assembled into one GIS.**

- **Variability of beach morphology exhibited in the historical BERM profiling database has begun to be analyzed for relation to character of the shoreface and innershelf framework. (Initial results showing this link have been presented at several professional meetings and initially reported in one publication; (Gayes et al., 2001).**
- **Modifications of the BERM Project in FY 2001 have been proposed to provide more detail of beach and nearshore changes in areas where such linkages are observed. A pilot study superimposing video images of the beach from a camera system set on top of a hotel roof in Myrtle Beach should be in place by August 2001. This system will begin to analyze the structure and variability of the nearshore bar and rip systems within areas of strong framework influence. This is being undertaken with through a cooperative between P.T. Gayes and J. MacMahan at Univ. of Florida. This direction of using the framework as the foundation to pose specific questions or locations for process studies is a direct application of the coop-USGS study plan. Long-term beach variability is being compiled by a separate project to M.S. Harris. Harris's students have digitized Anders maps of shoreline change and beginning the GIS analysis. Those map products will be directly overlaid on framework imagery to allow analysis of beach change on various temporal and spatial scales along the coast.**
- **Gayes, Schwab, Driscoll, Baldwin, and Barnhardt reviewed the geophysical records from the May 2001 cruise and laid out objectives for coring and groundtruth efforts. Fifty-one core locations were selected to groundtruth imagery and seismic data as well as begin to test initial interpretations of sediment dispersal pathways. These cores are scheduled to be taken on the August 2001 cruise on the NOAA Ship Ferrel (time awarded through NOAA/Sea Grant to Gayes). In addition, PI's Gayes and Schwab previously met with Bob Morton and Wayne Baldwin (USGS-St. Pete) to select coring locations to ground truth overall USGS inner shelf imagery. CCU collected 51 vibracores of those targeted locations on a previous cruise onboard the NOAA Ship Ferrel and is planning to collect 25 additional cores on the August of 2001 cruise. During that working session Gayes, Schwab, Morton and Baldwin also laid out a surficial sediment sampling scheme and locations of key bottom video track lines to ground truth the side scan imagery. CCU collected 400 surficial sediment grabs and USGS is present processing the samples for sediment texture. CCU is collecting bottom video as possible through ships of opportunity and through various undergraduate student projects. Dr. Eugene Karabonov has completed the splitting, description and photographing of the cores from the offshore mosaic and that data is being added to the GIS to aid in interpretations.**
- **The PIs have participated in several meetings seeking to establish additional support for the USGS objective of continuing large-scale regional mapping of the inner shelf. Agencies met to discuss the coop framework studies and potential utility, access and support include S.C. DNR, USACOE, MMS-INTERMAR and NMFS.**

2.1.5. Identify mean profile shapes and spatial variability along the South Carolina coastline; determine applicability of statistical models for this effort; and relate spatial variability to factors controlling beach morphology. (Voulgaris)

- ***Collection and organization of available data.*** **Available beach profile data were received from SCOCRM. Data from WIS stations A2033 (SC/GA border) through A2040 (SC/NC border) was downloaded from the USACE CEDRS database. Data from NOAA-NOS tidal stations (i.e., Springmaid Pier, SC,**

Charleston, SC, and Savannah River Entrance, GA) were downloaded and mean tidal ranges calculated for fifteen oceanfront tidal stations along the SC coastline. Sediment samples were collected at selected beach profile stations. LIDAR data were taken from the 1996-1997 NOAA South Carolina's Coast: A Remote Sensing Perspective initiative.

- *Sediment Sample Collection and Analysis.* Samples were collected at seventy-nine (79) beach profile stations along the coast. At each station, three samples were collected from the upper several mm of the beach: at the primary dune, lower beach-face, and active swash. Samples were taken as close to low tide as practicable. The percent organic content of the samples was determined. Fall velocities (Ws) for certain sediment percent intervals (i.e., Ws_{95}, Ws_{50}, etc.) were found using the rapid sediment analyzer at the CPSD. Fall velocities were used to convert to 'hydraulic' grain sizes in metric (mm) and phi (ϕ) scales for determining mean grain size, sorting, skewness, and kurtosis values following statistics of Folk and Ward (1957). These values were then used to determine overall mean statistics for each island/beach sampled.
- *Wave Climate Analysis.* WIS data included hindcastings of significant wave height (H_s), mean and peak wave periods (s), and mean and peak wave directions (meteorological convention, degrees from North) every 3 hours from 1975-1995. The frequency (percentage of occurrence) of significant wave height, mean wave period, and mean wave direction (meteorological convention, degrees from North), were determined at each WIS station. Coastline orientations (degrees from north) were determined for those segments of the coast that varied more than 5 degrees from the adjacent segment. Coastal segments were defined based on the similarity of coastline orientations. The orientations of these segments were used in nearshore wave calculations. The depths at each WIS station vary. For comparison purposes, wave characteristics were therefore all transformed to the –5 m contour, taking into account the effects of refraction, shoaling, and internal dumping using a model based on Linear Airy wave theory general expressions. The model assumes straight coastline segments with bathymetric contours oriented parallel to the coastline. Assuming that waves travelling only towards the coastline influence contours, the applicable wave field (contour orientation plus 180 degrees) for each coastal segment was then found. Mean wave direction was converted into angle of approach α. Wave data created (i.e., H_s and α) for the –5 m contour was then used to determine the long-shore (P_L) and cross-shore components (P_c) of wave energy flux (wave power, P) for each coastal segment. The net long-shore flux for each coastal segment was determined. A negative value in the net long-shore flux indicates a flux in the southern direction, while a positive value indicates a flux to the north.
- *Beach Profile Spatial Statistical Analysis.* The study of regional beach profile variation requires the definition of specific parameters for analysis. The parameters used for this study include mean profiles, bar variations, equilibrium profile expressions, slopes, and closure depths. These parameters describe morphologic features and may relate to governing hydrodynamic conditions. Time-averaged (mean) profiles were calculated for each BERM benchmark, as well as profile envelopes and standard deviations. Variations in bar morphology were determined using empirical orthogonal function (EOF) methods. Each eigenfunction represents a different spatial feature of the profile. While the first eigenfunction provides an arithmetic mean profile, the second eigenfunction typically shows a large

maximum at the location of the summer berm, and a minimum in the area of the offshore bar. The third eigenfunction shows a broad maximum at the location of the low-tide terrace. The second and third eigenfunctions, therefore, generally represent bar topography.

2.1.6. Identify the effect of tidal and wind forcing in the circulation patterns of the intercontinental shelf as well as changes in wave propagation as a function of depth, current strength, and current direction. (Voulgaris and Work)

- ***Tasks.*** **Upgrade of the 1200KHz RDI ADCP system with the WAVE module and testing. Deployment and recovery of both the RDI ADCP and the ADP during the period April 21st to May 30th, 2001 at locations off Pawleys Island (southern part of the Northern Study area). The ADCP was deployed in an average depth of water 12m while the ADP was further inshore at an average water depth of 6m. (Deployment locations: 33^{o} 35.759N, 78^{o} 51.196W and 33^{o} 35.769N, 78^{o} 51.196W for the ADP and ADCP stations respectively). Collection of additional ADCP current data from 6 more locations that can be used toward the establishment of the coastal current regime in Long Bay.**
- ***Initial Finding from Year 1.*** **No analysis of data and interpretation is to be provided at this stage of the project. However, a preliminary look at the data establishes two major points. The tidally-driven currents are aligned perpendicular to the coastline while the wind-driven currents are mainly along the shelf. Evidence of strong upwelling (i.e., onshore flows near the bed and offshore flows higher in the water column) were found in the location of deployment of the ADCP (12m depth). Also, comparison of the wave characteristics at the NDBC Edisto Buoy (station id 41004, water depth 37m, some 41 nm away) and the ADCP deployment location show a strong attenuation of the wave height while the spectral characteristics remain the same at the two locations.**

2.1.7. Develop an integrated GIS-based approach to quantifying rates of shoreline change and relevant geologic controls of change in the Georgia Bight. (Alexander *et al.*)

- ***Georgia Shoreline Change Project Aerial Photography Analysis*****. A series of aerial photographs from various years were selected from collections housed at the Georgia Department of Transportation, the Georgia Department of Natural Resources, and the National Geodetic Survey. Images that were chosen contain the most complete coverage of the shoreline with as much detail as possible for a given year. In some instances island-wide coverage could not be obtained due to the limited area of flight paths during a particular year. Two methods of extracting shoreline position were established that both involve selecting ground control points (GCPs) from base-layer 1993 USGS Digital Orthophotoquads of the Georgia coast. The polyline coverages of historical shorelines that have been completed primarily show the open-ocean side of each barrier island and the ends that might face inlets. Lagoonal or back-barrier island shorelines in most cases did not appear in the photographs at all or were obscured by vegetation. Some barrier islands do not have shoreline data for certain years due to gaps in available air photos, while Jekyll Island and Tybee Island have a more complete photographic history. Error reduction and quality control of digitized aerial photography is a very important issue. Peak RMS values should not exceed 0.012. Higher values than 0.012 can displace digitized shorelines from as little as 5-10 meters or more. Some photos have been encountered that will not produce an RMS value below 0.012 because of**

stretching, shrinking, and even warping of the photographic paper or medium. Such digitized images and their RMS values have been noted in the GIS database. It is clear that on-screen digitization of digital orthophotos can reduce error but requires time-consuming photo rectification. Commercially produced digital orthophotos are very expensive to have made as they are usually on the order of hundreds of dollars per photo, and thus beyond the resources of this project.

- ***Analysis of Historical Shoreline Positions*. Work at the Georgia Southern University (GSU) GIS facility is focused on digitizing and georeferencing historical, non-photographic shoreline data (i.e., T-sheets) for use in the shoreline change analysis of the southern study region. When we attempted to purchase hardcopy T-sheets for rasterization at GSU, we were informed that digital products would be available within a few months as part of a NOAA data rescue project. In July, the Coastal Services Center (CSC) in Charleston provided 60 rasterized T-Sheets of the South Atlantic Coast from Charleston, SC to Jacksonville, FL. These are scanned versions of the hardcopy charts in digital raster format. While waiting for the rasterized images to be produced by the CSC, students at GSU developed protocols for handling the digitization and registering of the images. Now that the images are in hand, the next step will be to apply the protocols that have been developed. Each rasterized image will be digitized and then georeferenced using Avenue scripts from Environmental Systems Research Institute's (ESRI) Arc Scripts to create world files for the ungeoreferenced charts. The world file script creates a world file based on the bounding coordinates of the input image. Subsequently, the mean high tide shoreline will be vectorized for all maps. The goal is to generate a geographic information system (GIS) database of mean high water level and historic shorelines of the study area using ArcInfo. The database produced from the T-sheets will include a series of maps showing the positions of selected historic shorelines (e.g. mid 1800s, late 1800s and early 1900s) which will be used for the shoreline change analysis and to quantify shoreline movement.**
- ***State of Knowledge Report for the South Carolina/Georgia Coastal Erosion Study: Phase II Southern Study Area.* There is currently no up-to-date synthesis of georesearch information for the apex of the Georgia Bight. A synthesis consequently needed to be developed that covered barrier coastline, shoreface, and inner shelf georesearch through 2001. Compiling this information on geodata and georesearch gaps is important for future coastal management and planning, and for identifying future research directions and opportunities. To accomplish these goals, an extensive literature search and review is being conducted that covers coastal physical processes, coastal change, coastal engineering, and coastal/inner shelf stratigraphic frameworks. The report presenting the findings and conclusions of the study will include a comprehensive, and partly-annotated, bibliography of references. Print and online databases are being searched to recover published, unpublished, and grey literature on coastal change, coastal engineering, stratigraphic frameworks, and atmospheric and oceanographic forcing mechanisms pertaining to the apex of the Georgia Bight. Coastal engineering consultants, federal and state agencies, and municipal agencies will be queried to obtain non-proprietary information for the GA/SC coast. Currently 95% complete on Information Compilation and Step 1 of Analysis of Information for the grey literature. Approximately 40 years of relevant grey literature, unpublished documents (project reports, technical reports, etc.), and MS and PhD theses are being compiled and**

reviewed from the archives at Georgia Southern's Applied Coastal Research Laboratory. Grey literature has also been retrieved from the Skidaway Institute of Oceanography's online grey literature database. These sources have yielded approximately 700 documents, of which ~30% are true grey literature, the remainder being regular published documents. Concurrent with, and to facilitate the review process, an annotated bibliography is being developed for the most relevant documents.

2.1.8. Develop educational materials for teachers K-16, and test the effectiveness of these materials as well as educational and outreach programs. (Sautter)

- ***Spatial and Temporal Variations of Folly Beach, SC Instructional CD-Rom, Website, and Teacher-Training Workshop*. Digital Images of Folly Island, dating from 1978 through 1998, have been obtained from the Army Corps of Engineers, DHEC's Office of Ocean and Coastal Resource Management, and the College of Charleston's Geology Department. Applications have been processed and approved by Jones and Bartlett Publishers to use many 'images from Paul Pinet's "Invitation to Oceanography" Second Edition. Permission has also been granted from the authors of "Of Sand and Sea" to use images for our educational website and CD-Rom. An image and text-based student tutorial on the barrier island formation and processes is being developed. Complimentary student activities, focusing on the temporal change of Folly, are also under development. We are currently exploring graphical options to present information on the CD-ROM and www.coastalgeology.org. Methods to incorporate teachers' use of ESRI's ARC Explorer are also under consideration.**
- ***South Carolina Coastal Journey Instructional CD-Rom*. The development of the South Carolina Coastal Journey CD-Rom is reaching its final stage. A PC version of the disc is up and running and was recently tested in front of this summer's class of COASTeam teachers. The CD-Rom documents and describes varying coastal features, starting from St. Helena Sound and continuing northward to the Myrtle Beach area. The disc contains over 40 aerial and ground level images of important coastal features. The CD has three different viewing options. The first option displays the images in order as one moves northward up the coast. An accompanying narrative can be used to narrate the slide show for an audience. The second option displays both the image and the accompanying narrative text for each slide. This option can be used for individual viewing purposes. The final option allows a viewer to navigate directly to individual slides without having to navigate through the entire progression of images. We believe that these options will increase the disc's usability in educational environments. The CD has more review and testing to go through before its final release scheduled for sometime early this fall. The disc will also be sent to' the individuals who donated photos, for final approval for their use.**
- ***USGS Coastal Erosion Project Educational Activity*. The goal of this portion of the USGS Phase I Coastal Erosion Project is to produce an educational activity accessible and understandable to an introductory college-level class and general audience. The results of Phase I, in particular the side scan sonar mosaics, are the focus for the activity. This activity is still in the process of being developed. The final product of the Phase I project, the side scan sonar mosaic product, which includes both the Folly and Isle of Palms mosaics, has been scanned into an easily manipulated jpg format. The activity involves students making observations and comparisons between the two mosaics to the coastline morphology, both nearshore and offshore,**

by comparing them to a scanned bathymetric chart image of the same region of the coastline. Students can manipulate the images, zoom in, and compare details between the maps to develop an understanding of the coastal processes affecting sediment transport, deposition, and erosion on this part of the South Carolina coast. Coastal geology terms, descriptions, relevant information, and links on the particular coastal processes will be available for browsing as well. The technology of the side scan sonar will be provided as an informational topic for viewing and exploring within the activity, to understand how the data was collected. Links to the dredging and nourishment scans will also be used as a tool for the student to explore the interactions of the features of shoreline processes. The activity is to be used and viewed as an interactive web page, possibly on the www.coastalgeology.org Web site, which is still under construction. This Web site includes beach profile data for Folly and Isle of Palms, which we hope to include and use in conjunction with the side scan mosaics. The links to beach profile data analysis and profile graphs (not yet available) will give the student a larger picture of the interaction of both onshore and offshore sediment transport processes. It will be possible to develop this activity in paper form as well, for distribution to schools, coastal managers, public officials, and anyone interested in the research.

2.2. There is a need to identify and understand the processes dominating the coastal ocean of the South Atlantic Bight (SAB). To address this need, the issue of beach nourishment, which is presently the primary erosion mitigation strategy in South Carolina and many other states, will be studied. A wave transformation model (SWAN) will be used to identify and characterize nearshore nourishment materials. The objectives are to determine: (1) nearshore impacts of dredging a previously identified sand source offshore of Folly Beach, SC; (2) the significance of wave-current interaction when making this assessment; and (3) the optimum borrow pit configuration. (Work: R/CE-5)

- **The researchers are in the process of quantifying impacts of proposed dredging at Folly Island, SC. The goal of the study is to investigate the impacts of dredging on the nearshore sediment transport rates. If dredging quantities are too large, or if dredging occurs too close to shore, it is possible to negatively impact the nearshore sediment transport rates and worsen beach erosion. Project methodology relies heavily on numerical models, which are currently being validated. In addition to providing answers about optimal dredging plans for the site, another goal is to provide more general recommendations regarding nearshore dredging for beach nourishment material. Several "footprints" of the dredge borrow area are now being considered to investigate best-and worst-case configurations.**

2.3. The relationship between an offshore shoal in the Myrtle Beach area and coastal erosion dynamics will be examined. The end goal is to characterize and quantify the potential for the shoal to be a sustainable borrow site for this economically important resort community. Specific objectives are to: (1) identify the effect of tidal and wind forcing around the shoal; (2) identify the effect of the shoal in controlling wave propagation and its role in "energetic events" (such as storms); (3) model the propagation of gravity waves for the prediction of wave characteristics; and (4) model coastal circulation over the shoal. (Voulgaris: R/CP-11)

- **This work, to be initiated in March 2003, is providing a better understanding of regional sediment dynamics critical for long-term coastal planning and engineering design purposes. Beach replenishment projects, construction of groins, seawalls and other soft and hard coastal engineering structures aim at restoring recreational beaches – an important issue for the economy of coastal South Carolina. These activities, however, can only be made effective through a more thorough understanding of the sediment dynamics, which this study will provide. Prevailing conditions (e.g., tides, currents, and winds) in these areas may be influenced by offshore topography and sediment availability. The objective of this study is to examine the relationship between an offshore shoal in the Myrtle Beach area and coastal erosion dynamics. The end goal is to characterize and quantify the potential for the shoal to be a sustainable borrow site for this economically important resort community. Specific objectives are to: (1) identify the effect of tidal and wind forcing around the shoal; (2) identify the effect of the shoal in controlling wave propagation and its role in "energetic events" (such as storms); (3) model the propagation of gravity waves for the prediction of wave characteristics; and (4) model coastal circulation over the shoal.**

2.4. Develop and distribute one press release and one information product in conjunction with coastal ocean processes and dynamics activities. (Ferris)

- **No press releases or information products were done in 2002.**

2.5. Develop and distribute one press release and one information product for the South Carolina/Georgia Coastal Erosion Study. Develop and distribute one press release in conjunction with Georgia communications. (Ferris)

- **News release, "Coastal Erosion Study updates state and local officials"**
- **Fact sheet, "Examining the effects of coastal erosion"**

2.6. Work with principal investigators Paul Work and George Voulgaris on project R/CE-5, *(Nearshore impacts of offshore dredging for beach nourishment)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results when the project is completed; a link will be established to their Web page. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site.**
- **News Release: "Researchers predict best place to mine Folly nourishment sand"**

2.7. Work with principal investigator George Voulgaris on project R/CP-11, *(Towards quantifying coastal erosion in S.C.: Offshore shoals as sediment sinks and controls for shoreline change)*. The Project will be briefly described in the research section of

S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results when the project is completed; we will assist with announcements and publications for Sea Grant Extension organized workshops. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site.**
- **Project not ready for article.**

2.8. In partnership with the NOAA Coastal Services Center, the College of Charleston, and other institutions, plan and organize the Southeastern Coastal Ocean Science conference and workshop, to be held in 2003. (DeVoe, Knight)

- **The Southeastern Coastal Ocean Science Conference and Workshop was held on January 27-31, 2003 in Charleston, SC, where more than 150 participants including 22 students from the region attended.**
- **The workshop consisted of three breakout sessions: Coastal Storms, Coastal Processes and Mapping; Ocean Processes, Living Marine Resources; Hydrology, Land Use Impacts.**
- **Additional details about the Conference/Workshop will be presented in the Consortium's 2003 Work Plan – Results and Outcomes document.**

2.9. Lend strategic planning and communications support to the Southeastern Coastal Ocean Science conference and workshop, to be held in 2003. (Blackwell)

- **Produced program materials and promotional items for conference/workshop.**

COASTAL ECOSYSTEM HEALTH AND SAFETY

Goal 3: Enhance the availability and quality of marine, estuarine, and freshwater resources that can support the economic and quality-of-life needs of South Carolina's public and private sectors.

3.1. Tools that identify individuals and populations experiencing chronic stress can provide means to detect early warning signs of ecosystem stress. Mitigation efforts may then be employed in a timely manner to prevent severe effects at the population and ecosystem levels. Means will be developed to test and validate promising cellular biomarkers. The objectives are to: (1) validate potentially valuable biomarker responses of anthropogenic perturbations on the health of two common estuarine bivalve species, the oyster, *Crassostrea virginica,* and marsh mussel, *Geukensia demissa*; (2) determine the effects of pollutant stress on reproductive potential and recruitment; and (3) identify linkages between cellular biomarker responses and parameters that are related to population success. (Ringwood: R/ER-19)

- **The research has built on previous year's work to develop an important means of testing and validating promising cellular biomarkers. This research has the potential to yield tools that will identify individuals and populations experiencing chronic stress. The value lies in the ability to detect early warning signs so that mitigation efforts may be employed to prevent severe effects at the population and ecosystem levels.**

3.2. Ecosystem dynamics along the Cooper River, South Carolina, will be studied by refining a model of succession of tidal freshwater wetlands on the river. The modeling effort will use data and successful modeling work from previous and ongoing studies. A better understanding of the ecological and human use values of the different habitats will provide the foundation for a holistic management plan of these wetlands. The focus of the study will be the roughly 2500 hectares of impoundments that were former rice fields, which are changing rapidly due to human intervention, such as the re-diversion of the Cooper River. The re-diversion project dramatically increased the pace of succession in these valuable wetlands. (Morris, *et al:* R/ER-20)

- **The researchers are engaged in determining best management alternatives for former rice field impoundments along the Cooper River. The habitats in these former rice fields are changing rapidly from open water fields to dense fields of cattails and other aquatic plants. The researchers have qualified the ecological values of different habitats in order to understand the ecological costs and benefits of different management practices. For example, fish habitat has been found to be better in fields that are maintained in an open state. Researchers have shown that the best course of action is to achieve a mixture of habitat types in order to maximize biodiversity and maintain a variety of ecosystem functions. Several meetings have been held with local interest groups to discuss the findings, and a special session on the ecological values of impoundments was held at the 2001 international meeting of the Estuarine Research Federation.**

3.3. The copepod *Amphiascus tenuiremis* will be studied as an estuarine model for work aimed at understanding the potential risk of a new pesticide. Genome-based technology, including PCR, will be used to look for genes associated with pesticide

resistance in order to develop a monitoring tool for a newly approved and highly toxic pesticide, fipronil. This pesticide is being used in areas adjacent to estuarine systems in South Carolina, such as golf courses. Genetic crosses will be made to test for heritability of resistance in the copepod. PCR methods developed from individuals will be used to screen wild populations as well as laboratory stock. (Staton: R/ER-21)

- **An acute toxicity test with an LC95 concentration of fipronil was performed on *Amphiascus tenuiremis* to determine if a small cohort of individuals could survive and be cultured for future toxicity testing and genetic analysis of fipronil resistance. These cultures are now well established in a flow-through sediment/seawater system. In addition, a full life-cycle microplate bioassay with *A. tenuiremis* has been developed to test for sublethal effects of a suite of pesticides, including fipronil. This bioassay method will be helpful in determining if *A. tenuiremis* displays any genetic resistance to fipronil. Individuals from the fipronil-exposed cultures have been collected for genetic analysis in order to compare their GABAA beta-like receptor gene sequence to that of non-exposed individuals. At this time, we have successfully isolated a GABAA beta-like receptor fragment from cDNA and are currently cloning and sequencing additional fragments to increase replication and to gain a more detailed picture of the gene. This information will allow us to use PCR techniques to amplify the GABAA beta-like receptor gene from individual *A. tenuiremis* and compare genetic variation between exposed and non-exposed populations leading to its use as a potential biomarker of exposure in the wild.**

3.4. Exposure-toxicity risk assessment tools will be developed based on the bioaccumulation of heavy metals in the benthic foraminiferan *Ammonia becarii* and concordant toxic response of the common benthic copepod, *Amphiascus tenuiremis*. The goal is to develop a linked-species model that relates bioaccumulation to exposure risk. The model will provide an index of exposure-impact that is calibrated to metal uptake. Ultimately, information gathered from contaminated sites can be used by managers to better determine appropriate limits and approaches to site clean-up. This information is economically valuable for its potential to reduce site clean-up costs, which tend to be high in estuarine settings. (Shaw: R/ER-22)

- **An acute toxicity test with an LC95 concentration of fipronil was performed on *Amphiascus tenuiremis* to determine if a small cohort of individuals could survive and be cultured for future toxicity testing and genetic analysis of fipronil resistance. These cultures are now well established in a flow-through sediment/seawater system. In addition, a full life-cycle microplate bioassay with *A. tenuiremis* has been developed to test for sublethal effects of a suite of pesticides, including fipronil. This bioassay method will be helpful in determining if *A. tenuiremis* displays any genetic resistance to fipronil. Individuals from the fipronil-exposed cultures have been collected for genetic analysis in order to compare their GABAA beta-like receptor gene sequence to that of non-exposed individuals. At this time, we have successfully isolated a GABAA beta-like receptor fragment from cDNA and are currently cloning and sequencing additional fragments to increase replication and to gain a more detailed picture of the gene. This information will allow us to use PCR techniques to amplify the GABAA beta-like receptor gene from individual *A. tenuiremis* and compare genetic variation between exposed and non-exposed populations leading to its use as a potential biomarker of exposure in the wild.**

3.5. Serious decline in coastal water quality and ecosystem health results from coastal development. Along with development comes an increase of anthropogenic wastes, leading to eutrophication and resulting ecological damage, such as fish kills and harmful algal blooms. The flux and chemical signature of groundwater, and impacts on various biological processes in tidal creek waters, will be quantified to understand the causes of damage and document ecosystem response to development. (Moore: R/ER-23)

- **The serious decline in coastal water quality and ecosystem health resulting from coastal development is under study. Development increases anthropogenic wastes, leading to eutrophication and resulting ecological damage, such as fish kills and harmful algal blooms. Understanding the causes of this damage and documenting an ecosystem's response are key objectives. The work, which is being conducted in conjunction with Georgia scientists supported through the University of Georgia Sea Grant College Program, will provide answers to basic questions about coastal ecosystem health.**

3.6. Plan, organize, and convene the 6th Biennial International Conference on Shellfish Restoration in Charleston, S.C. on November 20-24, 2002. (DeVoe, Knight, Blackwell, et al.)

- **The 6th Biennial ICSR conference was held as planned, and attended by over 200 participants.**
- **Oral and panel sessions covered the following topics: Emerging Issues in Shellfish Restoration, Success Criteria for Shellfish Projects, The Role of Aquaculture in Shellfish Restoration, Community Shellfish Restoration: Approaches, Methodologies, Success Stories, Community Restoration Programs: Getting Started and Keeping Going, Shellfish Genetics and Physiology, Water Quality Issues and Shellfish Restoration, Management and Policy Aspects of Shellfish Restoration, and Restoration Ecology.**
- **A Poster Session was also held as was a formal meeting of the East Coast Shellfish Growers Association Meeting.**
- **The next ICSR conference is scheduled for November 16-20, 2004.**

3.7. Lend strategic planning and communications support to the International Conference on Shellfish Restoration, to be held in November 2002. (Blackwell, Snow, Ferris)

3.7.1. Develop communications and publication timetable for ICSR-related materials (e.g., first and second announcements, conference program, etc.) (Blackwell)

- **Created and maintained production schedule for all conference materials and media.**
- **Designed and produced 3,500 First Announcements.**
- **Designed and produced 3,500 Second Announcements.**
- **Produced conference hats.**
- **Produced conference koozies.**
- **Produced 200 conference notebooks.**
- **Produced nametag shells.**

3.7.2. Adopt the SCSGC Web site to incorporate ICSR announcements, call for abstracts, etc. (Snow)

- **Created Web pages for registration and information purposes.**

3.7.3. Build an updated ICSR press release mailing list in Microsoft Access of 69 targeted national and international publications to enhance ICSR publicity. (Ferris)

- **Sent two press releases: 5/02 and 11/02, "6th International Conference on Shellfish Restoration Set for November 20-24, 2002"**

3.8. Publish and distribute a "Coast-A-Syst" homeowner's water quality workbook, CD-ROM and website. (Sawyer)

- **The SC Coast-A-Syst program is a series of environmental self-assessments, or checklists that make it easy for homeowners to record activities and conditions around the home that may affect water quality. In 2002, over 350 people underwent some sort of introduction or training on Coast-A-Syst. Workshops were held at Edisto Beach, Beaufort, Sun City, Charleston, Georgetown and Hilton Head. A web site www.clemson.edu/sccoastasyst has also been developed. The web site allows each participant to interactively engage in the risk assessments. If an individual identifies an area of medium or high risk, the result is automatically downloaded into an action checklist table. The tables can be printed out and posted where a homeowner will be prompted to make the appropriate changes to their identified risk activity. The user can leave the site and return at any time to complete the assessments. SC Coast-A-Syst was awarded 3rd Place in the SC Association of County Agricultural Agents publication category.**

3.9. Conduct Coast-A-Syst demonstrations and in-service trainings for up to 500 individuals in SC coastal communities on the use of alternative cleaners, the processes of composting and vermicomposting, safe selection and storage of household hazardous chemicals, and more. (Sawyer)

- **Since delivery of the Coast-A-Syst publication, there have been numerous forums used to disseminate the educational message. The Coast-A-Syst team conducted a demonstration project at the Grand Strand Home Show in Myrtle Beach, SC where team members provided demonstrations on the use of alternative cleaners, the processes of composting and vermicomposting, safe selection and storage of household hazardous chemicals, and more. It was a great success for the demonstrators as well as the attendees. Additional train-the-trainer programs have been held as well. Master Gardeners and County Extension Agents in the pilot area have both been trained to conduct Coast-A-Syst program in their regions. Each participant of such training receives the Coast-A-Syst Tool Kit on a CD-ROM, which is comprised of several necessary items to conduct programs on their own. The CD contains standardized presentations for use on a data projector or overhead slide projector. Also housed on the CD are example workshop flyers, press releases, and blank program evaluations. Evaluations for the training sessions were very favorable. Numerous presentations and workshops have also been held throughout the coast and the state of South Carolina. With the Coast-A-Syst program beginning to actually be visible, we are actually running into the possibility of needing additional publications. To date, over 500 people have undergone some sort of introduction or training on Coast-A-Syst.**

3.10. Develop and conduct an outreach education Harmful Algal Bloom workshop that increase awareness of and reduce risks from aquatic nuisance species and harmful algal blooms. (Sawyer, Whetstone)

- **In July 2002, Sawyer and Jack Whetstone conducted a Harmful Algal Bloom Workshop at NOAA's Center for Coastal Environmental Health and Biomolecular Research (CCEHBR) in Charleston, SC. The workshop was an outreach component of a grant from NOAA National Ocean Service for the Harmful Algal Bloom Initiative for South Carolina. Intended as an in-service training session for Clemson Extension agents, the workshop drew several agents, as well as representatives from NOAA, S.C. Department of Health and Environmental Control, S.C. Department of Natural Resources, University of South Carolina, U.S. Geological Survey, city of Myrtle Beach, city of Charleston, city of Isle of Palms, Town of Hilton Head, and Kiawah Island Community Association. After the workshop, attendees took a field trip to Kiawah Island with Norm Shea, Kiawah Island Community Association (KICA) lakes director. Since monitoring began on Kiawah, the golf course ponds have been algal bloom "hot spots" during the summer months. Participants on the field trip observed Susan Wilde with SCDNR and USC take water samples of the blue-green algae, and measure pH and salinity. Before Mr. Shea was hired, all the ponds were on a preventive schedule and sprayed with pesticides every month, costing upwards of $100,000 per year. Now KICA is taking an ecologically based approach to control the algal blooms, including working with HAB scientists to monitor the ponds and the U.S. Fish and Wildlife Service to stock oysters and install native *Spartina* grass. The majority of attendees surveyed rated the workshop very good or excellent in terms of presentation quality and information usefulness. As a result of the workshop, environmental horticulturalist Gary Forrester of Clemson Extension in Horry County is now working with the S.C. Phytoplankton Monitoring Network (SCPMN), a volunteer monitoring program directed by Steve Morton of NOAA CCEHBR. Mr. Forrester has recruited master gardeners to sample two locations once-a-week in Murrell's Inlet and Pawley's Island, and hopes to work with the SCPMN to expand the monitoring network to schools in Horry and Georgetown counties. SC Task Group on Toxic Algae – Sawyer and Whetstone serve as members of the SC State Task Group on Toxic Algae (SCTGTA). Scientists, state and federal resource officials, communications staff, and extension personnel discuss monitoring coastal waters, continuing research on toxic algae, providing analysis of potential impacts, and establishing methods of effective public outreach and education. The SCTGTA has recently developed a coordinated state strategy to cope with potential toxic algal blooms in South Carolina waters.**

3.11. Publish and distribute, in collaboration with SC OCRM and SC DNR/MRD a "Boater's Guide" to educate marina owners and coastal recreational boaters on Best Management Practices (BMPs) for water quality improvement and nonpoint source pollution prevention. (Sawyer)

- **The Complete Guide to Coastal Boating in South Carolina was published and delivered. Sawyer co-authored the manual and provided supporting research information. Copies of the publication will be delivered to all participating marinas and to members of the SC Marine Trade Association as well as the Sea Grant network. This publication is the result of a cooperative effort between South Carolina Department of Natural Resources, Beaufort County Special Area Management Plan, South Carolina Marina Association, and the South Carolina Sea Grant Consortium. The comprehensive guide provides boaters with information for management practices to help ensure the preservation of the aquatic environment. There are tips for safe use and**

disposal of potentially harmful products, as well as suggestions for safer alternative products. In addition, there is helpful information on observing regional wildlife, environmental programs, and a boater's directory with contact phone numbers for most boating situations.

3.12. In collaboration with SC Department of Health and Environmental Control (SCDHEC), Office of Ocean and Coastal Resource Management staff, develop and implement a pilot program to train and certify local governments to implement a septic system inspection and management program. (Sawyer)

- **This program was delayed until 2003 due to scheduling changes at SC OCRM.**

3.13. Conduct NEMO workshops for elected and appointed officials within communities in the 4 SCDHEC "priority" watersheds in SC. (Sawyer, Turner)

- **The NEMO Team (Sawyer and Turner) completed NEMO programming within the Seneca and Saluda watersheds during 2002. Following the establishment of an advisory committee, and several subsequent meetings, formal NEMO workshops were conducted in Oconee, Pickens, Anderson, Greenville, Laurens, Greenwood, and Abbeville counties. Clemson Extension personnel, including two Regional Directors, were critical to the delivery of programming throughout the watersheds. Twenty-four (24) additional NEMO presentations have been given by Sawyer/Turner across the state in 2002.**

- **In addition, a NEMO Inservice Training was conducted at the Sandhills REC for Community Leadership and Economic Development agents. Training participants were instructed about the use of natural resource based comprehensive planning, the importance of innovative site design, and the wise use of best management practices. The goal of the training effort was to have a cadre of knowledgeable agents, who work with community decision-makers, able to help with program delivery throughout the state. Each registrant received a CD-ROM of prepared presentations and other training materials designed to help them create interest in this important topic. Our state advisory committee has identified water quality as the number one issue facing the citizens of South Carolina. Participation in NEMO will allow CLED agents to bring the expertise of Clemson University to elected and appointed officials in targeted watersheds throughout the state.**
- **In 2002, the Statewide NEMO Web site was completed (www.scseagrant.org/scnemo). The Web site hosts regional and watershed presentations, fact sheets, GIS maps, and specific workshop information. Information specific to all four priority state watersheds (Catawba, Pee Dee, Saluda, and Seneca/Keowee) covered by the program are included within the framework of the Web site. The SC NEMO Web site has been nominated for several statewide and regional awards.**
- **Project partners include The Center for Environmental Policy at the University of South Carolina and the USC Earth Science and Resources Institute.**
- **Additionally,**
  - **Produced SC NEMO Fact Sheets and CD-ROM presentations.**
  - **Completed SC NEMO Web site www.scseagrant.org/scnemo.htm including watershed presentations, NEMO Fact Sheets, GIS maps illustrating land cover and water quality impairments, and specific project information on project partners, advisory committees, and workshops.**
  - **Conducted NEMO evaluation surveys among previous NEMO participants. Survey results indicated that 79 % of those individuals attending NEMO**

presentations and workshops have rated the program as very good. Further, 80% of these same attendees rated the NEMO Program as whole, very useful. Perhaps the most illuminating detail is that 92% of these elected officials saw strategies to reduce nonpoint source pollution as worth exploring further in their towns and communities.

- **Presented an overview of the SC NEMO program at a session of the SC Chapter of the American Planning Association Winter/Spring Conference in Columbia, SC (03/15).**
- **Worked with SC DNR staff representing the ACE Basin National Estuarine Research Reserve to discuss the possible role of SC NEMO program in the ACE Basin NERR Coastal Training Program (CTP).**
- **Employed student interns from the College of Charleston Masters in Environmental Studies Program.**
- **Advised Anderson County planning officials on a proposed Land Use and Development Standards Ordinance. Provided officials with suggestions related to impervious cover percentages for residential, commercial, and industrial development, open space planning, and alternative site designs for subdivisions. Suggested ordinance changes and additions were submitted for review to all County Council members, Planning Commission members, and the County Administrator (10/23).**
- **At the request of the Anderson County Administrator and Planning Director, the NEMO Team was invited to conduct a training session as part of a special planning meeting for the County Council and the Planning Commission to review and vote on adopting new land-use development regulations. The session was tailored to address the issues facing Anderson County with regard to water quality, storm water management, and costs of uncontrolled growth. The workshop was held on December 9, 2002.**
- **Briefed the North Charleston Planning Commission, North Charleston City Council (3/11) and Summerville Planning Commission (4/29) on the upcoming BCD NEMO project.**
- **Began preliminary design, development and organization of a final NEMO workshops (2) for the SC Coastal watershed, including finalizing agenda topics, selecting workshop speakers, determining workshop activities and slideshow presentation content. These *Taming Your Storm Water* workshops are scheduled to take place in May 2003.**

3.14. Establish interagency/organizational partnerships to fund and conduct NEMO activities. (Sawyer)

- **Project partners include The Center for Environmental Policy at the University of South Carolina and the USC Earth Science and Resources Institute, the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal resource Management, and the Berkeley-Charleston-Dorchester Council of Governments. Each of the organizations provides either direct funding for program activities or in-kind contributions as equipment, supplies, or staff time. Without these leveraged resources, the SC NEMO Program would be significantly weakened.**

3.15. Work with the National NEMO leadership in the development of the national NEMO network. (Sawyer)

- **National NEMO Conference Co-chair and Host – Sawyer served these dual roles for the 2nd NEMO University national conference in Charleston. There**

were 65 attendees from 25 states, representing 20 of the 23 National NEMO Network projects from around the country. This conference was the formal beginning of the National Network, in that the attendees agreed to sign a broad, conceptual Charter that defines the relationship of each project to the Connecticut Hub, the Hub to the projects, and the projects to each other. NEMO projects are starting to share educational models, publications, technical tools, and information across state lines. Individual states like Ohio, Indiana and South Carolina are starting to conduct their own research and develop their own publications, technical tools, and web sites. Diversity in topical themes and educational approaches is starting to occur. Real "bottom line" impacts to local public policy, as it affects water resources, are starting to accrue in some of the older projects.

3.16. Continue to organize, chair and coordinate the development of Continuing Certification Hours for Aquatic Pesticide Applicators Workshop/SCAPMS. (Whetstone)

- **Served as organizing Chairman, and made four presentations: Water Quality Parameters Effecting Aquatic Weed Control; Aquatic Plant ID - Live Specimens; Prevention, Mechanical, and Biological Control; and Management of Golf Courses to Reduce Aquatic Weed Problems at the Integrated Pest Management in Golf Course Ponds Short Course at the Carolinas Golf Course Superintendents Association Annual Conference. The 64 workshop participants earned 4-5 continuing certification hours from the North Carolina, South Carolina and Georgia Aquatic Pesticide Applicator's Licensing Divisions and the US Golf Association's Golf Course Superintendents Association.**
- **Associated Publications and activities include:**
  - **Aquatic Weed Control Chapter. Volume I - 2002 Pest Management Handbook. Clemson University Cooperative Extension Service Publication # EC 670. Pages 181-189. Robinette and Whetstone.**
  - **Whetstone, J. M. 2003. Aquatic Weed Control in Irrigation Water Supplies. South Carolina Turfgrass Foundation's Turf Pest Management Guide.**
  - **Integrated Pest Management for Aquatic Weed Control that the Grand Strand Golf Course Superintendents meeting at Preswick Country Club. 45 attendees. 1 Hour Continuing Certification Hour. SC Pesticide Regulatory Dept.**
  - **Aquatic Weed Control in Recreational Fish Ponds at the Beaufort, Hampton, Jasper County Pond Clinic. - 2 Continuing Certification Hours - Pesticide Regulatory Department.**
  - **Aquatic Weed Control, Identification, and Aquatic Weed Integrated Pest Management at the Charleston County Farm Pond Clinic. 2 Hours Continuing Certification Hours. Pesticide Applicators. SC Pesticide Regulatory Dept.**
  - **Aquaculture and Nuisance Aquatic Plant Management Programming in the Clemson University Water Quality Symposium.**
  - **Aquatic Weed ID and Control at the Sumter County Recreational Fish Pond Clinic. 2 continuing Certification Hours. SC Pesticide Regulatory Department.**
  - **Held a workshop with the Belle Isle Property Owners Association, a large development outside of Georgetown and discussed their pond management options on the lakes within the development.**

3.17. Complete work on an Integrated Pest Management study evaluating the effectiveness

of stocking of tilapia to control filamentous algae in farm ponds, horticultural gardens, golf course irrigation ponds, etc. (Whetstone)

- **Completed work on the project and made a series of in-state and out-of-state presentations based on the project work:**
  - **"Demonstration of Tilapia for Aquatic Weed Control in South Carolina Irrigation Ponds". South Carolina Aquatic Plant Management Society. Abstract.**
  - **Whetstone, J. M. 2002. "Demonstration of Aquatic Weed Control by Tilapia in South Carolina Irrigation Ponds". Clemson University Turfgrass Field Day.**
  - **Whetstone, Jack M. 2002. Demonstration of Aquatic Weed Control by Tilapia in South Carolina Irrigation Ponds. Aquatic Plant Management Society. Keystone, CO**
  - **Presented a program on pond management on the "Your Day", a one-hour radio program on the SC Educational Radio Network.**

3.18. Continue work with the US Fish and Wildlife Service on the control of aquatic vegetation and the development of a management plan for aquatic weed control at a wood stork nesting site in South Carolina. (Whetstone)

- **A management plan was developed to control aquatic vegetation while protecting the nesting habitat of the endangered Wood stork.**

3.19. Continue to work with International Paper, other industrial and municipal water users, SCDHEC and the US Army Corps of Engineers to employ integrated pest management (IPM) and the use of harvesters, biological control and herbicides to maintain surface water canals. (Whetstone)

- **The use of a number of types of pesticides was discussed with South Carolina Department of Health and Environmental Control. It was subsequently concluded that biological and mechanical control methods would offer a better alternative. The U.S. Army Corps of Engineers were contacted and agreed to furnish flea beetles to control the alligator weed problem in the canal. In May, the Corps of Engineers determined that they would be unable to fulfill their agreement because they were unable to capture any flea beetles. The project group will try the flea beetle option again in 2003. In a related development, during the summer of 2002 South Carolina entered a major drought. The Pee Dee River, which supplies the canal, became extremely shallow and *Egeria* developed at the industrial water intake. The project group worked with the South Carolina Department of Natural Resources Water Resources Division to formulate a control recommendation and determined to utilize copper herbicides to control the aquatic weed problem.**

3.20. Serve as members of the selection committee for the South Carolina Environmental Awareness Awards state-wide competition. (Blackwell, Knight)

- **Participated in all meetings of the selection committee and attended the awards ceremony held in Columbia in February 2003.**
- **Placed press release on Web site, "Nominations being sought for S.C. Environmental Awareness Award".**
- **Award-winner featured in the Winter 2002 issue of *Inside Sea Grant*.**

3.21. Serve as communications officer of the S.C. Task Group on Harmful Algae. (Ferris)

- **Ferris serves as communications officer of the S.C. Task Group on Harmful Algae.**

3.21.1. React to any HAB events by writing and distributing press releases and assisting with press conferences, if scheduled.
- **There were no HAB events in 2002.**

3.21.2. Develop and distribute one publication.
- **Produced Fact Sheet: "South Carolina Task Group on Harmful Algae"**

3.21.3. Attend Task Group meetings and workshops.
- **Participated in SCHAB and S.C. Task Group on Harmful Algae meetings March 21st.**
- **Attended a dinner meeting with several task group members and the grant manager from the Centers for Disease Control and Prevention (CDC) August 15th.**
- **Attended a S.C. Task Group on Harmful Algae meeting about the CDC grant August 16th.**

3.21.4. Publish *The South Carolina Task Group on Harmful Algae* newsletter three times yearly. (Ferris/Blackwell)
- ***South Carolina Task Group on Harmful Algae*, Vol. 4, No. 1, Spring 2002**
- ***South Carolina Task Group on Harmful Algae*, Vol. 4, No. 2, Fall 2002**
- ***South Carolina Task Group on Harmful Algae*, Vol. 4, No. 3, Spring 2003**

3.21.5. Create the design, text, and editing for the S.C. Task Group on Harmful Algae Web site. The site will be updated three times yearly. (Ferris/Snow)
- **Site is up and has been updated six times.**
  http://www.scseagrant.org/schab.htm

3.22. Support Sea Grant Extension environmental quality specialist by assisting with one workshop announcement and one press release for Non-point Education for Municipal Officials (NEMO). (Blackwell/Ferris)
- **News Release: "NEMO expands upstate and to the Cooper River Watershed"**

Goal 4: Examine the forces of climate and hazards, and to provide information to the public and private sectors on the nature of hazards and how to plan for them.

4.1. The Climate and Hazards program area focuses on efforts to develop tools and techniques to avoid and mitigate the effects of coastal natural hazards, such as high winds. The goal is to provide technical and educational programs that examine the forces of climate and hazards and provide information to the public. Technologies will be deployed for monitoring wind loads, to (1) characterize the wind structure in hurricanes and the associated wind loading of buildings in regions of strong convection; (2) evaluate performance of retrofit technologies in reducing hurricane wind damage and losses; and (3) determine how well conventional boundary layer wind tunnel model studies reproduce wind loads generated by convective winds and hurricanes. The research is significant in that wind loads on low rise buildings (such as residential homes) in the convective eyewall regions of a major hurricane have never been measured, although recent Doppler Radar research indicates complex wind structures exist. Understanding them will improve the ability of government and industry to establish cost effective mitigation measures. (Reinhold: R/CE-6)

- **Technologies for monitoring wind loads, developed by a Sea Grant Industrial Fellow, are being used to better understand wind loads on low rise buildings (such as residential homes) in the convective eyewall regions of hurricanes. Doppler Radar research indicates complex wind structures exist. Understanding them will improve the ability of government and industry to establish cost effective mitigation measures. To-date, houses along the coast have been identified and it is expected that by the 2003 hurricane season ten (10) houses will be retrofitted. House inspections and retrofitting are underway. Wiring homes has begun and all of the computer system and sensors have been assembled.**

4.2. With Dr. Reinhold, identify SC coastal residences to participate in the SCSG home retrofit and wind instrumentation research project. (Judge/Cunningham)

- **In conjunction with the research project of Dr. Reinhold (above), the Sea Grant program leader supervised intern, Cunningham, in locating coastal residences meeting project criteria. Assisted in the development of letters soliciting the participation in the project of eligible home owners. Cunningham designed and conducted a survey of participating homeowners about their knowledge of and attitudes about coastal storms. The survey also questioned homeowners about their willingness to spend money on home protection measures like storm shutters and improved roof systems.**

4.3. Work with Clemson Extension colleagues to develop and deliver a hazards-related workshop, certified by the S.C. Real Estate Commission, for CEU credit for South Carolina realtors. (Judge)

- **Worked with Clemson Extension agents Zoe James and Birdie Crosby on a continuing education course for real estate agents and Extension agents. Delivered the course in Greenville, SC (6/8/01) and in Columbia, SC. 90 agents attended.**

4.4. Make presentations to other professional audiences, including engineers, architects, and builders. (Judge)

- **Presented on 113 Calhoun Street at luncheon meeting of ASCE chapter in Savannah on 113 Calhoun Street. 26 people attended.**
- **Offered evening tours of 113 Calhoun Street to attendees of the NOAA Coastal Services Center's Vulnerability Assessment Techniques workshop. Engineers from Barbados, the University of the West Indies, and a private firm in Rhode Island attended.**
- **Conducted tour for new head of the National Insurance Task Force, Clayton Adams, and others from the insurance industry.**
- **Presented at the SC Association for Hazard Mitigation Roundtable: 113 Calhoun Street and Project Impact programming. Approximately 25 attended.**
- **Presented 113 Calhoun Street at America's Conference on Wind Engineering, Clemson, S.C. Approximately 40 people attended.**

4.5. Participate in public information activities such as hazards expos to share information with homeowners. (Judge)

- **Helped organize and presented program detailing the retrofit of 113 Calhoun Street at hurricane workshops in Savannah and Brunswick with Georgia Sea Grant. Over 60 attended.**
- **Conducted homeowner training class and 113 Calhoun Street tour for Habitat for Humanity homeowners. 13 attended.**
- **Staffed a display at Earth Force Youth Summit. Close to 500 middle school students attended the summit to learn about local environmental programming.**
- **Folly Beach Town Hurricane Meeting. Manned booth, talked to residents about preparing and protecting their homes. Approximately 150 people attended.**
- **Citadel Mall Mitigation Expo. Over 2000 people saw the booth.**
- **Home Depot/Dept. of Insurance Mitigation Expo in Bluffton, S.C. Over 1200 attended the Expo.**

4.6. Collaborate with other agencies on issues related to coastal hazards and regulations to enhance mitigation. For example, partner with the Office of Ocean and Coastal Resource Management on setback and permitting policies and Flood Insurance Rate Map (FIRM) concerns. (Judge)

- **Due to the resignation of the SCSGEP Coastal Hazards specialist in 2002, no progress has been made on this item.**

4.7. Collaborate with Dr. Tim Reinhold, Clemson University Civil Engineering, to complete hazards exhibits for 113 Calhoun St., including a load path exhibit, a garage door reinforcement demonstration and the introduction of a new roofing nail. (Judge, Bacon)

- **Provided support and assistance to Dr. Reinhold and graduate student, Scott Robinette, for the design, construction and installation of hazards displays and other interpretative materials at the 113 Calhoun Street Center for Sustainable Living. Displays included a mechanism to compare the resistance to withdrawal of various types of nails and screws used to attach roofing materials and a cutaway model showing recommended procedures and materials for a hazard resistant asphalt shingle roof system. Additional exhibits, including a load path model are currently under construction.**
- **Completed Consumer Guide for High Wind Construction (project funded by Blue Sky Foundation of NC); worked with Dr. Scott Schiff and 2 students on development of Technical Manual for High Wind Construction.**

- **Facilitated final edits of the Holding On to Your Roof video series and distribution via the Clemson PSA system.**
- **Edited and helped with final printing (by Sea Grant) of tri-fold brochures (developed with Tim Reinhold: Not Ready to Re-Roof? Use Structural Adhesives to Strengthen the Attachment of Roof Sheathing; Re-Roofing? Opportunities for Reducing Wind Damage Vulnerability When You Re-Roof; and Window and Door Protection: How Much is Enough?**

4.8. Conduct 113 Calhoun St. house tours and demonstrations of hazard mitigation tools and techniques. (Judge, Bacon)

- **In 2002, 593 people visited the demonstration house at 113 Calhoun Street. The Center's web site received 11, 623 visits from 6,415 individual host computers.**
- **Selected Tours:**
  - **Attendees of Green Building conference (approx. 30 total).**
  - **Developed and delivered one-day curriculum, including scavenger hunt, for middle school students. 15 middle school students attended as part of the Earth Force Summer Program.**
  - **Offered evening tours of 113 Calhoun Street to attendees of the NOAA Coastal Services Center's Vulnerability Assessment Techniques workshop. Engineers from Barbados, the University of the West Indies, and a private firm in Rhode Island attended.**
  - **Conducted tour for new head of the National Insurance Task Force, Clayton Adams, and others from the insurance industry.**

4.9. Maintain the 113 Calhoun St. Web site. (Judge)

- **Hazards specialist, Judge designed and maintained the 113 Calhoun Street Web site www.113calhoun.org. Since Judge's departure, the Web site has been maintained by Clemson Extension staff at the Center in cooperation with the Consortium (Snow).**

4.10. Co-teach a College of Charleston Architecture graduate course on sustainable and hazard resistant building and design. (Judge)

- **Co-taught with Clemson Extension colleague, Dick Dalla Mura, a College of Charleston/Clemson cooperative Architecture course, (ARCH 490 404 - DIRECTED STUDIES) to five students.**

4.11. Work with the National Severe Storms Laboratory, National Weather Service and North Carolina Sea Grant on the extension elements of a pilot project to test a new Doppler radar-based, multi-sensor approach to improved flash flood warnings in the Tar River basin in NC. (Bacon).

- **The National Severe Storms Laboratory (NSSL), National Sea Grant (NSG) College Program, Oklahoma University (OU), Vieux & Associates Inc. (VA), North Carolina State University (NCSU), and the North and South Carolina Sea Grant programs have established a joint project centered in North Carolina areas affected by Hurricane Floyd. The primary demonstration area is the Tar-Pamlico River basin. This project, called IFLOW (Inland FLooding Observation and Warning or "IFLOW"), has established a research and demonstration program for the evaluation and testing of new technologies and techniques to produce accurate and timely identification of inland and coastal floods and flash floods.**

- **The previously funded components of Project IFLOW included coupling of Vflo, a physics-based distributed hydrologic model (Vieux 2001; Vieux and Vieux 2002), with QPE-SUMS (Quantitative Precipitation Estimation and Segregation Using Multiple Sensors; Gourley et al. 2001), a cutting edge multi-sensor precipitation estimation technique. Recently, Vflo and QPE-SUMS began producing real-time estimates of precipitation and river stage for key points along the Tar River Basin.**
- **The initial products are available to researchers, forecasters, and other potential users through the Internet in real-time. By making these products selectively available, we continue to enhance research and development, while providing an opportunity for our collaborators and their end-users the ability to access, evaluate, and help develop improved methodologies for more accurate and timely flood and flash flood warnings and mitigation strategies.**
- **It is the intent of Project IFLOW to continue to foster partnerships and collaborative relationships with OAR's Sea Grant Extension and the NWS Office of Hydrological Services and their constituents through the deployment of NSSL's suite of advanced software and algorithms. The initial deployment of the first two components, NSSL's QPE-SUMS and Vflo, now provide the opportunity for the coupling of a storm surge and lateral inundation prediction model. In addition to coupling the Vflo model output to the estuary model.**
- **Working with the North Carolina Emergency Management Agency, Sea Grant Extension has made contact with flood plain managers in the project area and designed a data collection protocol to identify and locate flood "hot spots" within communities. The data will be used by the Vflo modelers to locate high-risk flood areas on flood inundation maps to enhance flood warnings to those areas.**

4.12. Coordinate the activities of the national Sea Grant Hazards Theme Team. (DeVoe, Bacon)

- **The Sea Grant Coastal Natural Hazards Theme Team was established in 2001 with DeVoe and Vijay Panchang (NSGCP) serving as co-chairs, along with Fred Hutchinson of the National Sea Grant Review Panel. Membership on the team includes a representative from Sea Grant extension (Bacon), communications (Blackwell), and education (Osis). The team developed and produced a Coastal Natural Hazards Thematic one-pager, which is available on-line through the National Sea Grant Web site. In addition, the Sea Grant HazNet Web site was updated to include a section on hazards theme team activities.**

4.13. Serve as SC co-PI on the SEA-COOS (South Eastern Atlantic – Coastal Ocean Observing System) outreach project to help ensure observational data collected is useful in a variety of coastal management and economic settings. (DeVoe, Bacon)

- **Participated in a SEA-COOS organizational meeting in Chapel Hill, NC at which the South Atlantic Sea Grant programs (NC, SC, GA, FL) were tasked with creating links between project scientists and likely ocean observations user groups. The aim is to develop data products and applications relevant and useful to user groups.**
- **Conducted an email survey of SEA-COOS scientists to learn which groups the scientists are already working with and which groups they think might be potential users. The top three groups were marine transportation, coastal hazards and recreation and tourism.**
- **2003 plans call for a continuing regional effort in extension and education with focused state programs (in planning stages).**

4.13.1. Host one regional SEA-COOS user group workshop and participate in three other regional workshops in collaborator states. (DeVoe, Bacon)

- **Held a regional extension workshop in Charleston at which SEA-COOS scientists provided basic information about ocean observing systems and the kinds of data likely to come from them to Sea Grant Extension agents and selected members of the user community, including: SC DHEC Office of Coastal Resource Management, National Weather Service, SC Marine Association, NC Marine Trades Association, US Army Corps of Engineers, GA State Climatologist, and the Phytoplankton Monitoring Network.**

4.13.2. Convene one or more in-state SEA-COOS workshops. (DeVoe, Bacon)

- **The referenced workshop(s) is now planned for 2003.**

4.14. Keep the public informed by distributing 100 hurricane preparation checklists and other hazard-related information. (Blackwell)

- **At least 400 hazard-related publications were requested and distributed.**

4.15. Keep the public informed by distributing two press releases concerning hurricane safety and what types of literature is available at the Consortium. (Ferris)

- ***Coastal Heritage* article: "Video series describes strategies to protect roofs"**
- **News Release: "Hurricane test houses to be chosen on Carolina coast"**
- **News Release: "Hurricane Preparation Publications from S.C. Sea Grant"**

4.16. Include Web links to Sea Grant HazNet, which is a collaborative effort of the Sea Grant network programs in hazard mitigation. This Web site has a wide range of Sea Grant and other information on it including Sea Grant hazards, research reports, hazards fact sheets, K-12 hazards education materials, and links to other hazards related sites. (Snow)

- **HazNet www.haznet.org is linked to the Consortium Web site.**

4.17. Serve as chair of the public relations committee for the 113 Calhoun project, offer assistance with print products such as a 4x9 rack card and a self-guided tour booklet, produce signs for the 113 Calhoun exhibits. (Blackwell)

- **Serves as chair of the public relations committee.**
- **Reprinted 1,500 marketing brochures.**
- **Designed and produced 5,000 4x9 rack cards.**
- **Self-guided tour booklet is in editing stage.**
- **Exhibit signs have not been completed.**

4.18. Assist the Sea Grant Extension coastal hazards specialist with one technical bulletin geared towards homeowners and builders that describe building techniques and materials for hazard loss reduction. (Blackwell)

- **Not completed due to loss of coastal hazards specialist position.**

4.19. Collaborate with the Sea Grant Extension coastal hazards specialist to develop supporting materials for one homeowner hazards workshop. (Blackwell)

- **Not completed due to loss of coastal hazards specialist position.**

4.20. Serve as a member of the National Hazards Theme Team and produce one hazards publication. (Blackwell)

- **Serves as communications specialist.**

4.21. Work with principal investigator Timothy Reinhold on project R/CE-5, *(Determination of hurricane wind loads and wind events)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site; one press release will be written to announce the start of the project; one news or feature article will be written and sent to appropriate outlets on the results of the project. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site. http://www.scseagrant.org/research/research_clihaz.htm**
- **Project not ready for article.**

ECONOMIC LEADERSHIP

Goal 5: Develop techniques, technologies, and new products based on marine systems for use in commercial and industrial applications, and to continue to apply low-cost technologies to coastal and marine resource problems.

5.1. The development of a molecular genetic characterization of the haloorganic degradation activity of cordgrass, *Spartina alterniflora*, and the isolation of the corresponding gene, will pave the way for the generation of super-dehalogenerator plants by conventional breeding and gene transfer. The plant will then be used for new remediation technologies. Such a genetically engineered plant may play a significant role in the remediation of pollutants in estuarine and marsh habitats. These improved transgenic organisms are targeted for use in soil or water bioremediation in sites contaminated with halogenated organics. (Marton: R/MT-4)

- **By developing a molecular genetic characterization of the haloorganic degradation activity of cordgrass, *Spartina alterniflora*, the research team expects to pave the way for the generation of super-dehalogenerator plants by conventional breeding and gene transfer. The plant will then be used for new remediation technologies. Such a genetically engineered plant may play a significant role in the remediation of pollutants in estuarine and marsh habitats. These improved transgenic organisms are targeted for use in soil or water bioremediation in sites contaminated with halogenated organics.**

5.2. Advances in population genetics technologies will be used with the inland silverside fish, an estuarine "sentinel species," to measure population genetic responses to contaminant history across select sites with various qualitative and quantitative levels of contamination. Theoretical and empirical population genetics are being used to determine chronic and subtle effects of pollutants on marine and estuarine resources resulting from anthropogenic activities. One product will be genetic assays to identify exposure levels of contaminants of concern in South Carolina. (Quattro: R/MT-5)

- **The inland silverside, an estuarine "sentinel species," is being used to measure population genetic responses to contaminant history across select sites with various qualitative and quantitative levels of contamination. The researchers are using theoretical and empirical population genetics to determine chronic and subtle effects of pollutants on marine and estuarine resources resulting from anthropogenic activities. They are now developing indicator alleles that express specific levels of habitat quality and serve as molecular probes, or biomarkers, for assessing effects of environmental stressors on organisms. One product will be genetic assays to identify exposure levels of contaminants of concern in South Carolina.**

5.3. In a first-of-its-kind, cDNA micro-arrays will be used as a tool for analyzing environmental stressors and disease. The research will apply this new technology to local populations of the commercially important species of white shrimp, *Litopenaeus setiferus*, which is also a keystone species in South Carolina estuarine systems. Two key objectives of the project are to: (1) collect and analyze functional genomic data to understand their physiological interaction with the environment using bioinformatic-

based approaches and (2) train new researchers, particularly graduate students, in the new and emerging technologies associated with "eco-genomics." (Gross: R/MT-6)

- **cDNA micro-arrays are being used to analyze genetic response of litopenaeid shrimp to a variety of stressors. The research looks at functional genomic data in relation to various environmental stressors and analyzes these data using bioinformatic-based approaches. Another goal is to train a new generation of scientists in these methods. Two graduate students are now involved in generating a comprehensive micro-array for stress analysis. A third student is developing a suite of web-based bioinformatic tools for organizing, analyzing and disseminating the collected data from these efforts.**

5.4. The Comparative Institute for Fisheries Molecular Biology (FISHTEC) research project will enhance our knowledge about the population biology of commercially important pelagic fish species, such as tunas and swordfish. Additional species will be added to the project for study, such as southern flounder, croaker and scup. One initiative will focus on species in "evolutionary significant areas." Future initiatives will be integrated with the genomics work that will be done in the new Hollings Marine Lab at Fort Johnson, Charleston, S.C. Recent advances in genomics, molecular biology, and population genetic theory will be used to identify the potential for xenobiotics to induce genetic change at the population level. Work also will be done to study genetic divergence within and among endemic species occupying unique southeastern ecosystems. (DeVoe *et al:* R/FT-1)

- **The 2001-2004 Comparative Institute for Fisheries Molecular Biology (FISHTEC) research program continues to enhance knowledge about the population biology of commercially important pelagic fish species, such as tunas and swordfish. PCR-based technologies are now being used to better understand shark population genetics as these fishes become threatened. Other research is beginning to focus on issues related to "Ecologically Significant Areas" (fish habitats). Southern flounder, croaker and scup have been added to the growing list of species under investigation. Several manuscripts have been accepted for publication in peer-reviewed journals this past year; a FISHTEC product inventory is maintained and is available upon request. A year three (out of three) progress report and proposal will be submitted to NOAA NOS in mid-April 2003.**

5.4.1. Apply molecular genetics to better understand fish populations. Focus will be on pelagic, commercially important fishes such as tuna, and rare or threatened species. (Ely, Quattro)

- **This project is ongoing (entering Year 3 of a three-year cycle). The PIs' work is on target and they have submitted the required semi-annual progress reports for the reporting period. Those reports were forwarded to NOAA via Dr. Malcolm Meaburn.**

5.4.2. Determine the stock structure of coastal marine fisheries of Southeastern United States through use of advanced molecular genetic techniques. Species of interest will be southern flounder, croaker, and scup. (Chapman)

- **This project is ongoing (entering Year 3 of a three-year cycle). The PIs' work is on target and they have submitted the required semi-annual progress reports for the reporting period. Those reports were forwarded to NOAA via Dr. Malcolm Meaburn.**

5.5. Deliver the results of the FISHTEC research program to potential users in the state, regional, and federal marine and fisheries management community. (Bacon, Dwyer, intern)

- **This project was scheduled for the spring of 2003, although preparatory work got underway during the last quarter of 2002. In 2002, an intern was hired to begin development of linkages between FISHTEC scientists and the fishery management community at the state and Federal levels. The FISHTEC board met March 26, 2003, and discussed various aspects of this project (target audience; workshop content; goals). Plans in 2003 call for a series of informal workshops between scientists and fishery managers to discuss past and current research results and to guide future research.**

5.5.1. Convene a workshop at which there is a two-way exchange between FISHTEC researchers and the user community to convey possible solutions to management problems and suggest future research directions. (Bacon, Dwyer, intern)

- **The fisheries extension intern has been given a seat on the Education and Outreach Advisory Panel of the South Atlantic Fisheries Council and will further explore the best way to "marry" FISHTEC technology with real-world fisheries management needs. That panel meets in May. We now envision a workshop no sooner than early summer 2003.**

5.5.2. Develop and distribute a related publication that explores research results and applications with relevance to management issues. (Dwyer, Bacon, intern)

- **Yet to be completed.**

5.6. Provide the public with information concerning advances in biotechnology that will affect them by writing one feature article for *Coastal Heritage* magazine. (Tibbetts)

- **Project not ready for feature article.**

5.7. Work with principal investigator László Márton on project R/MT-4*, (Remediation of haloorganic pollutants with Spartina alterniflora)*. The Project will be briefly described in the research section of S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results of the project. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site. http://www.scseagrant.org/research/research_emetech.htm**
- **Project not ready for article.**

5.8. Work with principal investigator Joseph Quattro on project R/MT-5*, (Marine evolutionary ecotoxicology-using genomic and population genetic theory to infer the impact of contaminants on natural populations)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results of the project. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site. http://www.scseagrant.org/research/research_emetech.htm**
- **Project not ready for article.**

Goal 6: Enhance the development of viable and sustainable aquaculture and fisheries in South Carolina and the region.

6.1. In the area of resource conservation, a multi-disciplinary team approach will address restoration of declining recreational fisheries. Red drum, *Sciaenops ocellatus,* is South Carolina's most popular coastal recreational fishery, but is in severe decline, and consequently, an appropriate candidate for stock enhancement as a fishery management tool. Various methods will be researched to improve the culture of red drum broodstock and track the release of nearly half a million of the sport fish annually to determine the effectiveness of the overall stocking program in juvenile habitats. (Smith: R/SE-1)

- **This project will examine the potential of increasing the red drum population in Murrell's Inlet, one of the most heavily developed and fished coastal areas in SC. Based on landings information, abundance of red drum in this estuary appears low. By stocking fish it should be possible to determine if there is sufficient habitat to support a larger population and whether there's a recruitment bottleneck limiting the number of fish entering the system. Brood stocks have been collected and are being spawned. Fry are being stocked in ponds and approximately 500,000 juveniles are expected to be available in September/October to stock the Murrell's Inlet estuary. Fish will be marked prior to stocking and local anglers are expected to assist in the stocking and assessment efforts.**

6.2. Development of the shrimp aquaculture industry in the United States, and its competitiveness on an international level, has been slowed by various impediments. One of those is the issue of water exchange. A research team will examine future expansion and development of the U.S. commercial shrimp farming industry from the application of zero exchange, biosecure, super-intensive shrimp production systems. The goal of the research is to devise filtration systems that will be effective in the removal of carbon and nitrogen from the system. This will allow greater loading on the system, which in turn will permit increased stocking densities. (Weirich: R/A-33)

- **The research team is examining future expansion and development of the U.S. commercial shrimp farming industry by the application of zero exchange, biosecure, super-intensive shrimp production systems. Extensive and semi-intensive culture systems simply are not competitive in the open marketplace. Through support of the USDA US Marine Shrimp Farming Program, the researchers have developed a super-intensive production system. They are now devising filtration systems to determine their effectiveness in the removal of carbon and nitrogen, allowing for increased stocking densities.**

6.3 Continue working with the Atlantic States Marine Fisheries Commission task group in the formulation of aquaculture policy for all Atlantic states. (Whetstone)

- **Authored four sections of Special Report No. 76 of the Atlantic States Marine Fisheries Commission, *Guidance Relative to Development of Responsible Aquaculture Activities in Atlantic Coast States*. November 2002. http://asmfc.org/PUB/Special%20Reports/AquacultureGuidanceDocument.pdf**

6.3 Complete a policy paper on User Conflicts and Water Allocation. (Whetstone)

- **This paper is contained within the report cited above in item 6.3.**

6.4 Continue to work with the South Carolina Department of Natural Resources and the South Carolina Shellfish Association to expand the capabilities and increase the involvement of the industry in the policy and regulatory process. (Whetstone)

- **Co-chair of the Organizing Committee of the East Coast Shellfish Seed Transport Workshop to be held on February 21 and 22, 2003. Obtained a $1000.00 grant from the South Carolina Aquaculture Association to support the Workshop and have prepared an industry overview for presentation at the workshop.**
- **Currently chairing an industry panel that is working to develop guidelines to for interstate transportation of clam seed. Currently states regulate and restrict seed transport due to concern about the spread of disease. The industry guidelines will suggest best management practices to reduce these concerns and facilitate interstate commerce in seed.**
- **The Virginia Marine Commission imposed emergency regulations in August, 2002, that does not allow the importation of seed clams originating from South Carolina into Virginia Waters. Research at the Virginia Institute of Marine Science determined that seed clams from broodstock from South Carolina and Florida were more susceptible to QPX disease than their native clams. Their concern is the genetic basis of Virginia clams. This ban would have a major impact on the clam aquaculture industry in South Carolina. South Carolina clam farmers sell approximately $1/2 million worth of seed clams in Virginia each year. Over 100 million clam seed total have been shipped to Virginia from SC in the last three years. At the request of South Carolina hatcheries, I attended the Virginia Marine Commission meeting in Norfolk, Virginia and presented testimony at their public hearing on allowing seed clams from South Carolina, but with broodstock northern broodstock parentage to be marketed in Virginia. In this instance the seed were not from South Carolina broodstock but were documented to be from New Jersey broodstock. New Jersey Broodstock seed were actually documented to be less susceptible to disease than Virginia broodstock seed. I continued to work on documentation of SC seed being shipped to Virginia. The Virginia Commission had no idea of the volume of seed Virginia farmers were receiving from SC. The state of Virginia, through the Virginia Marine Commission, reversed/amended their emergency ban on the importation of clam seed from southern states if broodstock can be documented from northern broodstock parentage. This change in regulations allows for a continuation of an industry valued at $500,000 per year to commercial aquaculture in SC to continue.**

6.3. Assist the South Carolina Shrimp Growers Association in understanding and complying with EPA discharge regulations for aquaculture. (Whetstone)

- **Attended the South Carolina Shrimp Growers Association and the give a presentation on the 2002 USDA Non insured Agricultural Products Insurance Program and the US EPA Regulatory Review of Aquaculture Discharge NPDES Permits. The South Carolina Shrimp Growers Association annual meeting presentation included information on the EPA reissue of discharge regulations for aquaculture. The discharge regulations will greatly affect the aquaculture industry, particularly shrimp farming, in South Carolina.**

6.4. Assist in the compilation of information on the economic feasibility of shrimp farming since EPA will develop treatment recommendations according to the ability of the particular industry to afford such treatment. (Whetstone)

- **Continued to work as chair of the Marine Shrimp Effluents Subcommittee of the US Joint Subcommittee on Aquaculture's Aquaculture Effluents Taskforce on the EPA NPDES reissuance. Held a conference call with the EPA contractor to discuss shrimp farm management in South Carolina and furnished additional effluent information from Edisto Shrimp Farm to assist in the re issuance of NPDES guidelines. A compilation of information on the economic feasibility of shrimp farming was developed with input from the commercial shrimp farms in the US. Since EPA will develop treatment recommendations according to the ability of the particular industry to afford such treatment, the baseline actual costs and income from the farms are extremely important to the development of regulations. Two budgets were developed. One budget represented the SC situation and another budget represented the Texas situation.**

6.5. Continue to chair the economic section for the Joint Subcommittee on Aquaculture Effluents Taskforce Shrimp Group. (Whetstone)

- **With the rework of the US EPA NPDES permits real world economic data and enterprise budgets from each species group was required by EPA. The regulatory requirements and technology requirements for treatment will be based on the industry's ability to pay for the technology. Enterprise budgets were developed for South Carolina and Texas and at the insistence of the National Aquaculture Association, were reviewed by farmers in each state and submitted to EPA.**

6.6. Continue to work with the Joint Subcommittee on Aquaculture and co-chair, with Granvil Treece with Texas Sea Grant, the Marine Shrimp Aquaculture Effluents Committee. The program through EPA continues to look at re-regulation of shrimp aquaculture effluents and the issues of non-native species escapements and diseases. As a co-chair of the committee, the next major effort will be the formation of SBREFA (Small Business Regulatory Enforcement and Fairness Act) Panel to examine the effects of regulation on small business. (Whetstone)

- **The Small Regulatory Enforcement and Fairness Act panel was held in February 2002. At the direction of the committee South Carolina was represented by two commercial aquaculture farmers on the panel and it appears that small businesses (those businesses with less than $750,000 gross in come per year) will not be affected by the new EPA regulations.**
- **Was an invited presenter (travel paid by USDA) and attended the US EPA public hearing on new proposed NPDES regulations on aquaculture effluents in Washington DC. I testified that for the marine shrimp aquaculture industry at the public hearing and the Taskforce Workshop on NPDES regulations.**

6.7. Serve as a member of the South Atlantic Sea Grant Regional Fisheries Extension Initiative steering committee with other South Atlantic Sea Grant Extension Program leaders. (Bacon)

- **Funding from Congress to support the National Sea Grant Fishery Extension Enhancement initiative was not appropriated in the FY 2003 Federal budget. A S.C. Sea Grant Extension Program FEE proposal was prepared and submitted**

to the National Sea Grant Office for review and possible funding from the FY 2004 Federal budget.

- **In the proposal development process, S.C. Sea Grant re-established a working relationship with the South Atlantic Fishery Management Council (SAFMC), which has appointed South Atlantic Sea Grant Extension Program representatives to its Information and Education Advisory Panel.**

6.10.1. Identify individuals from SC DNR - MRD to serve on Marine Protected Area (MPA) and Essential Fish Habitat (EFH) project work teams.

- **Mr. Mel Bell, SCDNR, is serving as the Sea Grant Extension representative to the regional Marine Protected Areas working group. Ms. Priscilla Wendt, SCDNR, is serving on the Sea Grant Extension representative on the regional Essential Fish Habitat working group.**

6.10.2. With other regional SGE program leaders, assist and guide the project work teams.

- **An organizational meeting was held in 2002 to organize the South Atlantic regional fishery extension effort. At this meeting representatives from each state Sea Grant program met and divided into project teams. The MPA team began and is currently working on an MPA primer to be distributed to stakeholder audiences through out the region and used by the SAFMC in its public education process on MPAs in the Snapper-Grouper Amendment process. The EFH project team is working to incorporate estuarine and coastal ocean water quality issues into each state's existing Non-point Education for Municipal Officials (NEMO) water quality education programs.**

6.10.3. With other regional SGE program leaders, plan for Spring 2003 a South Atlantic Regional Fisheries Conference to identify regional fisheries issues and develop future fishery applied research and extension programs.

- **Work on this objective has been delayed due in great part to the unexpected shrimp industry crisis that arose late in 2002.**

6.5 Work with principal investigator Theodore Smith on project R/SE-1*, (Impacts of stocked red drum on the recreational fishery and local community economic impact considerations)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results of the project. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site. http://www.scseagrant.org/research/research_sed.htm**
- **Project not ready for article.**

6.6 Work with principal investigator C.R. Weirich on project R/A-33*, (Application of emerging marine water treatment technologies for use in zero exchange biosecure super-intensive shrimp production systems)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site; one news or feature article will be written and sent to appropriate outlets on the results of the project. (Tibbetts)

- **The project is featured in the research section of the SCSGC Web site. http://www.scseagrant.org/research/research_sed.htm**
- **Project not ready for article.**

Goal 7: Develop and implement activities to assist coastal communities and small businesses with growth management and sustainable economic development strategies.

7.1. The overall goal of The South Atlantic Bight Land Use - Coastal Ecosystem Study (LU-CES) is to establish a functional understanding of the environmental and socioeconomic trends that characterize the southeastern U.S. coastal region, and to fill critical information gaps that currently limit the identification of links between population and development trends and their effects on the region's ecosystems. The end goal is the refinement of tools to predict impacts, build conceptual models of linkages between habitats and ecosystems, and define the spatial scale at which management will have the highest probability of minimizing or avoiding impacts. Fieldwork will be done in the Okatee River system. To best achieve its goals, LU-CES will organize around the following five teams: Physical Attributes and Hydrology; Geochemistry and Nutrients; Toxic Contaminants and Ecological Effects; Land Use; and Database Management/GIS Modeling/Land Use. A LU-CES web site will be developed and utilized as a means for LU-CES investigators to coordinate field activity and share data. The site may be accessed at: **www.lu-ces.org**. (DeVoe *et al:* R/COP-7)

- **A complete annual report that presents the results of the LU-CES program through 2002 can be found at: http://www.lu-ces.org/documents/Reports/Y2annualreport.pdf**

7.1.1 Develop a 3-D finite-volume hydrodynamic model of the physical oceanographic aspects of the Okatee complex; measure the hypsometric curve of the Okatee; and establish water quality monitoring stations. (Blanton *et al.*)

- **The main activities of Year 2 have been (1) to implement a project to measure the hypsometric curve of the Okatee-Colleton salt marsh-tidal creek complex, (2) to analyze physical oceanographic data from the first field experiment, (3) to test the validity of a 3-D finite-volume hydrodynamic model, (4) to gage freshwater inflow to the Okatee River, and (5) establish and maintain continuous water quality monitoring stations in the Okatee River and Malind Creek.**

7.1.2 Develop a quantitative understanding of trends in water quality, estuarine metabolism, and patterns of nutrient exchange in the study area. (McKellar *et al.*)

- **The main goal of the Geochemistry and Nutrient Research group is to develop a quantitative understanding of trends in water quality, estuarine metabolism, and patterns of nutrient exchange in a southeastern estuary subjected to rapid coastal development. This group is focusing its efforts on assessing the dominant sources, distributions, and interactions of sediments, oxygen, and nutrients (carbon, nitrogen, and phosphorus) in the Okatee River Estuary. The research is being conducted by engaging in the following three coordinated tasks:**
  - **Gas fluxes (O_2 and CO_2) and alkalinity as integrated indicators of the functioning of the estuary**
  - **Surface water distributions and tidal exchanges of sediments, nutrients (carbon, nitrogen and phosphorus) and chlorophyll and**

- **Role of groundwater in the biogeochemical cycles of carbon, nitrogen and phosphorus**
- **These data will be used to develop and calibrate predictive models of nutrient dynamics, coupled with estuarine hydrodynamics (Blanton, Chen) and land-use changes (Porter and Allen).**

7.1.3 Assess the ecotoxicological risks of land-based pollution sources that may discharge as non-point source runoff into the estuarine tidal creeks of the Okatee system. (Lee *et al.*)

- **The Toxic Contaminants and Ecological Effects group of the LUCES Project is focused on assessing the ecotoxicological risks of land-based pollution sources that may discharge via nonpoint source runoff (NPS) into adjoining estuarine tidal creeks. Four main objectives are being pursued:**
  - **Identify the types and magnitude of chemical and bacterial contaminants in surface waters, sediment and biota.**
  - **Ecotoxicological hazards of sediment-associated chemical contaminants in grass shrimp, copepods, juvenile clams and annelid worms**
  - **Bioavailaability and fate/effects of chemical contaminants from urban nonpoint source runoff**
  - **Microbiological hazards and sources associated with urban and agricultural nonpoint source runoff**

7.1.4 Develop a Web-enhanced, GIS-based database management and information dissemination program, as well as an integrated surface and groundwater model of fecal coliform bacteria and nutrients associated with land uses adjacent to estuaries in the study area. Apply models to management needs such as: improvement of understanding of land-use patterns; prediction of impacts of stressors associated with various land uses. (Porter *et al.*)

- **This project component builds upon a LU-CES State of Knowledge (SOK) project directed by Porter, Allen, and Siewicki that examined existing coastal environmental database management and modeling efforts, and identified the need for and developed draft guidelines for data management and information dissemination for use by the LU-CES project throughout its life. The objectives of this component are to:**
  - **Develop a web-enhanced, GIS-based database management and information dissemination program in support of the LU-CES Program.**
  - **Develop a GIS-based, integrated surface and groundwater model of fecal coliform bacteria and nutrients from golf course spray fields and associated developments into adjacent estuaries applicable to other southeastern areas.**
- **This LU-CES research component addresses the following LU-CES objectives:**
  - **Describing the hydrologic and hydrodynamic characteristics of the basin, estuaries and salt marshes at the anchor sites, with an emphasis on the salt marsh – tidal creek complex;**
  - **Identifying a suite of "indicators" of specific land uses that are associated with anchor site watersheds and sub-watersheds;**
  - **Documenting point and non-point sources of contaminants (including nutrients and microbial contaminants) and other indicators and the details of their loading dynamics;**
  - **Linking mechanistic models to GIS-based data sets of natural and**

cultural land uses and hydrologic attributes at the anchor sites (LU-CES Program 1999).

7.2. Sustainable economic development is a major goal of the Consortium. Its "Coastal Growth Initiative" will seek to (1) develop a coordinated approach to outreach education related to coastal land use impacts on natural resources; (2) establish a support framework to enhance the SC NEMO program; (3) develop outreach education programs to offer advice and assistance to coastal communities in developing comprehensive land use plans consistent with environmental health and resource conservation; and (4) enhance delivery of information developed through Sea Grant land use research programs, such as LU-CES. (DeVoe, Turner: A/CG-1)

- **Participated in the Open Space Planning Boot Camp workshop in Groton, CT (08/05 – 06). The National NEMO Network and the University of Connecticut Cooperative Extension System hosted the workshop. The USEPA Office of Policy, Economics and Innovation, Division of Community and Development sponsored the program. Participants were engaged in a series of presentations, focusing on Smart Growth, the history of the American open space movement, conducting a community resource inventory (CRI), and using GIS to facilitate resource inventories and open space planning, followed by open forum and roundtable discussions. Based on what was learned from the training sessions, participants were responsible for developing and implementing an open space, planning education module in 2003 to pilot in a coastal community.**
- **Initiated development of an open space-planning module to pilot in a coastal community (based on CT NEMO training session). Began preliminary research on open space planning to develop a slide show presentation tailored to coastal SC. (Ongoing). Discussed the possibilities of piloting an open space project with three planners from municipalities in Beaufort County. The interested communities include: Town of Port Royal, City of Beaufort, and Town of Bluffton.**
- **Selected the Town of Edisto Beach and the Town of Bluffton as recipients of the 2003 SC Coastal Community Initiative Grant (01/03). This grant award is part of the Coastal Growth Initiative (Objective 2), which serves as a support framework to enhance the SC NEMO program. Each of the successful applicants will receive a grant award of $2,500. Both municipalities are proposing to update their comprehensive plans, with a focus on open space planning requirements.**
- **Attended the Community Builders Conference in Greenville, sponsored by the Community Builders organization, formerly known as the SC Downtown Development Association. During this 3-day conference, participated in a variety of plenary and concurrent sessions, focusing on designing for healthy communities and to preserve community character, implementing well thought out development designs and streetscapes, and the future role of the federal and state transportation departments in improving communities.**
- **Asked to serve on the National Estuarine Research Reserve (NERR) ACE Basin Coastal Training Program Technical Committee (01/06). Membership on the CTP Technical Committee will give Sea Grant the opportunity to provide input into the planning of issues to be covered, strategy, and proposed training techniques for the Coastal Training Program. The training opportunities will be focused on the Colleton County municipal officials and other various community leaders. The CTP program goal is to provide a coordinated and strategic approach to training for coastal decision-makers. Program**

development and implementation is a collaborative effort among SC DHEC/OCRM, NOAA/CSC, and the S.C. Sea Grant Consortium to design a program that covers all gaps in training, avoids duplication of effort and capitalizes on partnership opportunities in coastal SC.

7.3. Continue working with the Land Use – Coastal Ecosystem Study (LU-CES) project team to develop outreach/education implementation strategies to assist with the dissemination for the LU-CES research information and products to state agency personnel, municipal officials, planners, the development community and general public. (Turner)

- **Attended several LU-CES Project Investigator meetings during the year where team leaders presented their team's research findings for project Year4. Meeting participants' discussions included project research updates, data management and data integration, defining remaining data gaps and needs and future project research planning for Year5.**
- **Participated in a LU-CES User-Defined Problem Solving workshop in Columbia, SC, at which those in attendance addressed the problems with scientific information transfer. The group assembled to brainstorm ideas for intelligent tools that will allow users at multiple levels of technical expertise to query the LU-CES information base (including data, reports, links and other types of information) in order to solve problems specific to their needs.**
- **Participated in a LU-CES User Defining Problem Solving (UDPS) meeting in Savannah, GA (10/17). Members of the resource management, planning and development communities were invited to the meeting to discuss and identify the general, specialty-specific, logic-paths that different disciplines use to solve their specific problems. Getting potential user feedback is the first step in developing the new UDPS approach, which entails developing a web-based "tool" that finds the appropriate information and packages it in a form that is meaningful to and understandable by the user. The participants provided valuable input and the meeting was very productive.**
- **Participated with LU-CES team members and OCRM staff in the planning of a presentation and reception highlighting the current progress of the LU-CES and Beaufort SAMP projects for local community leaders in Beaufort County. Turner assisted with general logistical planning and compiled an invitation list database of community leaders and local government staff. The event was held on June 26 at a facility on Spring Island in Beaufort County.**
- **Developed a poster highlighting key focal points of the LU-CES program project that was displayed at the June 26 LU-CES PI meeting and reception.**
- **Attended the LU-CES PI meeting at Spring Island in Beaufort County, where team leaders presented and discussed their research findings to date.**
- **Attended the Joint LU-CES/Beaufort SAMP presentation and reception at the Art Barn on Spring Island (Beaufort County). Representatives of the Beaufort SAMP and LU-CES research teams gave several short presentations. The keynote speaker was author Pat Conroy. The speakers were followed by a reception where guests had the opportunity to browse through posters, maps, and other informational products. Researchers were also on hand to answer any questions related to these programs. The event attendees included elected and appointed officials, local, state, and federal agency folks, and NGO staff.**

7.4. Work with SCDHEC-OCRM staff to collect and analyze all local government comprehensive land use plans in the eight (8) coastal counties to assess local assistance needs in land-use planning. (Turner)

- **Held several informal planning meetings and/or conference calls with municipal planners and university researchers to discuss the Land Use Plan Review and Analysis for the Coastal Growth Initiative (Objective 3) and a possible plan of action. Sent out a draft copy of the comp plan checklist for review and comment by various land use and community development experts including municipal planning staff, a county planner, a university researcher and an extension specialist.**
- **Continued development of the comp plan review checklist making suggested edits provided by the previously mentioned land use and community development experts. Met with a SCDHEC/OCRM planner (Ward Reynolds) to discuss the final changes to comprehensive plan review checklist and to determine a schedule and strategy for implementing the review process.**
- **Continued collecting local government comprehensive land use plans for the target coastal communities, including eight (8) counties and forty-two (42) municipalities.**
- **Began initial review of land use and natural resource elements of comprehensive plans acquired.**
- **Compiled a current database of community leaders and staff members from all municipal and county government in the eight coastal counties.**
- **Asked to serve on the National Estuarine Research Reserve (NERR) ACE Basin Coastal Training Program Technical Committee (01/06). Membership on the CTP Technical Committee will give Sea Grant the opportunity to provide input into the planning of issues to be covered, strategy, and proposed training techniques for the Coastal Training Program. The training opportunities will be focused on the Colleton County municipal officials and other various community leaders. The CTP program goal is to provide a coordinated and strategic approach to training for coastal decision-makers. Program development and implementation is a collaborative effort among SC DHEC/OCRM, NOAA/CSC, and the S.C. Sea Grant Consortium to design a program that covers all gaps in training, avoids duplication of effort and capitalizes on partnership opportunities in coastal SC.**
- **Assisted a Lowcountry COG planner (Vonie Gilreath) with a request to review the natural and cultural resource elements of the Town of Edisto Beach Comprehensive Plan, which was in the process of being updated. Turner reviewed the Comp plan updates and provided comments/suggestions related to innovative site design principles, the use of pervious pavers, open space preservation, and site-level stormwater treatment for incorporation into the plan to protect and manage the Town's natural resources.**

7.5. Continuing serving on OCRM's Sustainable Coastal Communities Initiative Advisory Committee, to monitor funded stormwater management, wetland restoration, and greenway projects. (Turner)

- **Served on the Sustainable Coastal Communities Initiative Advisory Committee.**
- **Participated in the review process of Sustainable Communities Grant Initiative proposals. There were seven (7) proposals submitted for review from coastal communities. The award total for this year is $75,000 to be administered by planning staff from SC DHEC Ocean and Coastal Resource Management office to those projects that most closely match the goals and objectives of the Initiative. Five (5) projects were selected to receive funding: a passive park in**

Folly Beach; a stormwater drainage inventory and management plan for the Town of Hardeeville; a greenway trail master plan in North Myrtle Beach; and a design plan for a public waterfront park in Mt. Pleasant. The communities that received the award have one year to complete their projects.

7.6. Serve on the Sustainable Economic Resources Action Committee to address growth and development strategies for the Sewee to Santee Economic Development Initiative to provide concrete action steps to help Awendaw, McClellanville, and the surrounding rural areas strengthen economies, protect the environment and meet community needs. (Turner)

- **At the request of the Sustainable Economic Resources Action Committee, provided information and research materials related to economic development strategies based on value-added processing and products to help meet community needs, protect natural resources, and maintain rural character in the region. Collaborated with members of the Sustainable Economic Resources Action Committee to address growth and development strategies for the Sewee to Santee Economic Development Initiative. Project progress suffered delays implementing recommended strategies due to organizational changes.**

7.7. Continue work with the Ashley Scenic River Advisory Committee on the education/outreach components (framework and strategies) of the Ashley River Management Plan. (Turner)

- **Served as an Ex-Officio member of the Ashley Scenic River Advisory Council (ASRAC) and continued work on the education/outreach components (framework and strategies) of the Ashley River Management Plan, in particular related to conservation land-use management for the region.**
- **Attended ASRAC meetings throughout the year. Meeting topics included adopting new members to the council, providing updates on the status of the Ashley Scenic River Management Plan, and discussing future actions and activities for the council.**
- **Served on the Conservation and Land Use Management Sub-Committee (C&LUM), one of four sub-committees created by the Council to handle the various aspects of the Ashley River Management Plan. Subcommittee members gathered on many occasions to discuss plan findings and recommendations relevant to that particular sub group and future tasks for plan implementation. The group is taking a two-pronged approach to reaching the target audiences, focusing on educating public officials and local government staff as well as private property owners with large land holdings along the Ashley River. The goal is to introduce the target audience to the Ashley River Management Plan and its recommendations for land use and development, water quality, NPS pollution, and conservation of valuable natural and cultural resources through presentation meetings/workshops.**
- **Turner developed a database of current elected and appointed officials and municipal staff for the municipalities within the boundaries of the Ashley Scenic River Management Plan and submitted it to the ASRAC.**
- **Contributed to the compilation of a contact list of all private property owners with substantial holdings along the Ashley River and assisted with preliminary design/development of a tool book of landscape and development guidelines.**
- **The ASRAC continued planning a schedule for presentation development, delivery, announcement, and distribution of the Ashley River Management Plan publication. The printing of the publication is to take place in March 2003 and a**

date has been set (04/24) to unveil the Ashley River Management Plan to the general public.

7.8. Serve on the Environmental Cost Analysis and Smart Growth Index sib-committee of the Committee on Growth Options Partnering coordinated by the B-C-D COG. (Turner)

- **Participating on the Growth Options Partnering Committee coordinated by the B-C-D Council of Governments. The Growth Options Committee has been divided into smaller working committees and the Coastal Communities specialist is participating on the Environmental Cost Analysis and Smart Growth Index Committees as well.**
- **Over the course of the year participated in committee meetings to help shape the future direction of the Growth Options Study. Topics of the presentations delivered at meetings included regional housing affordability relative to comparable areas, metro area traffic congestion and national trends, and areas experiencing highest growth in the region. The various presentations were followed by some discussion and updates on the development of the cost/benefit model. Due to some unforeseen problems with some of the data collection, model development was not completed as of the last committee meeting in 2002. Since that time, some of the data collection methods have been revamped and new alternative scenarios developed to complete the model, which will be ready to unveil in Spring of 2003.**

7.9. Continue serving as an advisor to the Board of the SC Nature-Based Tourism Association. (Bacon)

- **Have served as an Advisory Board member of the SCNBTA since the establishment of the association in 1994.**

7.10. Assist the SCNBTA with program planning for its annual conference. (Bacon)

- **Assisted the conference planning committee in identifying speakers for its 2002 conference.**

7.11. Continue to advise and assist local leaders in the planning and support of the Tidelands Birding Festival, a regional birding and wildlife festival in the Grand Strand region. (Bacon)

- **Due to state budget cuts that curtailed the participation of the SC State Parks and the continuing vacancy (also due to state budget cuts) in the S.C. Sea Grant Coastal Recreation and Tourism program position, the festival was not held in 2002.**

7.12. Include Web links to sustainable economic development topics such as aquaculture, nature-based tourism, and related conferences. (Snow/Bacon)

- **Links have been made to sustainable economic development topics and current conferences are featured on the Consortium Web site.**
  - **The S.C. Nature-Based Tourism Association http://scnatureadventures.com**
  - **South Carolina birding locations http://www.midnet.sc.edu/audubon/spots.htm**
  - **South Carolina Audubon Society http://www.audubon.org/chapter/sc/**
  - **Carolina Bird Club http://www.carolinabirdclub.org/**
  - **Great Backyard Bird Count http://www.birdsource.org/gbbc/**

7.13. Assist the Sea Grant Extension coastal recreation and tourism specialist with workshops by providing one news release and one workshop publication. (Blackwell/Ferris)

- **Not completed due to loss of coastal recreation and tourism specialist position.**

7.14. Write and distribute one press release and two feature stories about the LU-CES program. (Ferris)

- **Media Release: "Scientists examine coastal land-use effects"**
- **Featured in NOAA's Web Spotlight: "Unique Collaborative Land Use Study Enters Field Research Phase"**
- **Featured in the Southeast and Gulf Regional Sea Grant Web site: "Land-use researchers ready for field studies"**

EDUCATION AND HUMAN RESOURCES

Goal 8: Design and implement educational programs that foster a more scientifically and environmentally informed citizenry.

8.1. The COASTeam marine education program will train South Carolina elementary teachers in standards-based multi-disciplinary science. Objectives are to: (1) develop and implement a marine and aquatic science education curriculum specifically aligned to the Science Curriculum Standards at each elementary grade level; (2) involve many teachers at each grade level within each participating school; and (3) target elementary teachers at schools with high percentages of at-risk youth. "Aquatic Workshops" will serve as the basic tool for accomplishing the goals of this marine education project **http://www.cofc.edu/oceanica**. (Sautter: E/O-16)

- **The COASTeam marine education program addresses ongoing efforts to meet the needs of South Carolina elementary teachers for standards-based multi-disciplinary science criteria. For the reporting period, 2,300 K-12 students were taught by teachers who completed COASTeam training. In June 2002, COASTeam partnered with the National Science Foundation's "Project Inquiry" to train middle school teachers in the Charleston and Berkley County school districts.**

8.2. Support the participation of 15 elementary and middle school students in the 4-H Marine Science summer camping program. (Bacon, Core Group)

- **Provided a $3,000 grant to Clemson's 4-H Youth Learning Institute for scholarships for the Camp Sewee Marine Science Program in 2002. The scholarship funds allowed 15 campers from limited resource families to participate in this camping/learning experience. S.C. Sea Grant Extension was instrumental in the creation of 4-H marine science camps in SC beginning in 1990. S.C. Sea Grant Extension agents developed and taught the curriculum for the camps until 1994. Since then, Sea Grant has provided grant support to help mostly minority students get a summer, hands-on learning experience in marine sciences.**

8.3. Serve as state co-coordinator for Beach Sweep/River Sweep while continuing to emphasize the educational aspects of the program. Sign up 90 coastal site captains for the 2002 Sweep, write and distribute three press releases, and tabulate the number of volunteers and pounds of litter. (Ferris)

- **Ferris serves as state co-coordinator for Beach Sweep/River Sweep.**
- **125 coastal site captains were signed up.**
- **Five press releases were distributed:**
  - **2002 Beach Sweep/River Sweep calendar listing information to the S.C. Aquarium for the next issue of *Tributaries.***
  - **2002 Beach Sweep/River Sweep calendar listing information to Charleston County Solid Waste for the next issue of *For Land's Sake.***
  - **"2002 Beach Sweep/River Sweep set for September 21"**
  - **"Beach Sweep/River Sweep Call for Volunteers"**
  - **"Volunteers Needed for Beach Sweep/River Sweep"**
- **There were over 6,000 volunteers on the coast.**
- **There was over 59 tons of litter picked up on the coast.**

8.4. Write, design, and produce an updated Beach Sweep/River Sweep educational adventure book targeted toward K-5 school children. This book will follow the adventures of Petey the Pelican and Otto the Otter as they make their way through South Carolina's watershed system. This book will show the effects that aquatic debris has on our waterways. (Blackwell)

- **The story is written and a rough layout is completed. Waiting on additional funds to continue project.**

8.5. Work with principal investigator Leslie Sautter on project E/O-16, *(COASTeam aquatic workshops – a school-wide approach to integrating marine and aquatic concepts into the K-5 science curriculum)*. The project will be briefly described in the research section of S.C. Sea Grant's Web site and will also be featured in the site's education section. One news or feature article will be written and sent to appropriate outlets on the results of the project; we will continue to link to the COASTeam Web page. (Blackwell/Ferris/Snow)

- **The project is featured in the education section of the SCSGC Web site. http://www.scseagrant.org/education/education_coasteam.htm**
- **The SCSGC Web site is linked to the COASTeam Web page.**
- **Project not ready for article.**

8.6. Based on the success (as measured by our biennial survey and purge) of the *Coastal Heritage* magazine, we plan to continue building on that success, and at the same time build visibility for the Consortium. (Tibbetts/Snow)

8.6.1. *Coastal Heritage* will be produced four times a year.

- ***Coastal Heritage*, Vol. 16, No. 3, Winter 2001, "Triumph of the Weed"**
- ***Coastal Heritage*, Vol. 16, No. 4, Spring 2002, "Where have all the joiners gone?"**
- ***Coastal Heritage*, Vol. 17, No. 1, Summer 2002, "Floyd Follies: What We've Learned"**
- ***Coastal Heritage,* Vol. 17. No. 2, Fall 2002 "Rise and Fall and Rise… South Carolina's Maritime History"**

8.6.2. A survey/mail purge will be conducted in 2002.

- **A survey/mail purge was conducted and is still being tabulated.**

8.6.3. Requests for *Coastal Heritage* will be monitored.

- **1,608 copies of *Coastal Heritage* were requested by telephone, through e-mail, and the Web.**

8.6.4. The magazine will be submitted to two award competitions.

- ***Coastal Heritage* was submitted to two categories of the APEX award competition. It received an "Award of Excellence" from the 2002 APEX Awards for Publication Excellence for the "Magazines and Journals – Printed" category.**

8.7. An educational curriculum based on *Coastal Heritage* topics will be developed and distributed to middle and high schools with each issue of *Coastal Heritage*. (Jolly-Clair)

- **Three *Coastal Heritage Curriculum Connections* were produced and placed on the SCSGC Web site. http://www.scseagrant.org/text_version/education_ch_curr_text.htm. The fall 2002 issue was mailed to middle and high schools in coastal counties.**
  - **Vol. 17, No. 1, Summer 2002, "Floyd Follies: What We've Learned"**
  - **Vol. 17, No. 2, Fall 2002, "Rise and Fall and Rise…South Carolina's Maritime History"**
  - **Vol. 17, No. 3, Winter 2002-03, "The Freeway City"**

8.8. *Inside Sea Grant,* the internal newsletter of the S.C. Sea Grant Consortium was developed to maintain information flow between the Consortium and its key constituents. Communications will continue to publish this newsletter twice yearly. (Blackwell/Tibbetts)
- ***Inside Sea Grant*, Vol. 6, No. 1, Summer 2002, "Consortium receives National Sea Grant award for 2002-2003**
- ***Inside Sea Grant*, Vol. 6, No. 2, Winter 2002, "Volunteers clear away tons of trash"**

8.9. Promote S.C. Sea Grant's programs and services by writing and distributing 15 press releases and manning a display for two festivals in 2002. (Ferris)
- **20 press releases were written and distributed.**
- **Five displays were set up and manned.**
  - **Coordinated SCSGC exhibit at the S.C. Marine Educators Association conference (100 attendees)**
  - **Set up S.C. Sea Grant display at the College of Charleston Communications Career Fair to advertise internship announcement.**
  - **Set up Beach Sweep/River Sweep display at the Earth Day Festival in Charleston.**
  - **Represented S.C. Sea Grant at the NOAA Ocean Exploration Days Waterfront Education Festival, which drew 250 students and their teachers.**
  - **Represented S.C. Sea Grant at Port Fest 2002 hosted by the Charleston Maritime Center and the Maritime Association of the Port of Charleston**

8.10. Promote S.C. Sea Grant's programs and services by working with at least three other state agencies and NGOs. (Ferris)
- **Partnered with S.C. Department of Natural Resources and Palmetto Pride in Beach Sweep/River Sweep.**
- **Partnered with the S.C. Department of Natural Resources, National Oceanic and Atmospheric Administration, S.C. Department of Health and Environmental Control, University of South Carolina, Hollings Marine Laboratory, Medical University of South Carolina, Charleston Veteran's Affairs Medical Center, and Clemson University in the S.C. Task Group on Harmful Algae.**

8.11. South Carolina's communications program and leadership is committed to a strong national program. Communications will provide both leadership and supporting roles as the network addresses this important issue in light of the current Sea Grant reauthorization process. (Blackwell/Snow)

8.11.1. Serve as chair of the National Publications Task Force. (Blackwell)
- **Blackwell serves as chair of the National Publications Task Force.**

8.11.2. Serve as a member of the National Communicator's Steering Committee. (Blackwell)
- **Blackwell is a member of the National Communicator's Steering Committee.**

8.11.3. Serve as a member of the National Hazards Theme Team. (Blackwell)
- **Blackwell is a member of the National Hazards Theme Team.**

8.11.4. Serve as a member of the National Media Relations Advisory Committee. (Blackwell)
- **Blackwell is a member of the National Media Relations Advisory Committee.**

8.11.5. Serve as a member of the National Sea Grant Web Group. (Snow)
- **Snow is a member of the Sea Grant Network Webmaster's Association.**

8.12. As part of the national publications task force and in cooperation with the national Sea Grant office, communications will design and produce the *National Sea Grant College Program Biennial Report*. (Blackwell)
- **Designed and produced the *National Sea Grant College Program Biennial Report, 2000-2001***

8.13. Continue to support Ben Sherman and the national media project by responding to ProfNet inquiries whenever possible, distributing two national press releases locally, and attending two meetings, either in person or by conference call. (Blackwell)
- **Distributed Sherman release to SC media, "Sea Grant Project to Be Highlighted At Ocean Commission Meeting"**
- **Distributed Sherman release to SC media, "Sea Grant to Testify Before U.S. Ocean Commission: South Carolina Officials to Explain Benefits of University-Based Partnerships"**
- **Distributed Sherman release to SC media, "Sharks in Perspective: From Fear to Fascination"**

8.14. Serve as co-PI on the National Media Relations Project. (Blackwell)
- **Completed 03/01/00 to 02/28/01 performance review.**
- **Completed 03/01/01 to 02/28/02 performance review.**
- **Working on 03/01/02 to 02/28/03 planning document.**

Goal 9: Promote the development of a diverse and technically trained workforce.

9.1. An important goal of the South Carolina Sea Grant program is to stimulate interest of minority students in careers in marine and related sciences. The Strategic Partnership to Enhance Experiential Learning in Marine Sciences will develop internships, mentored by scientists from the SCDNR, the Oakridge National Laboratories, and an Orangeburg (S.C.) fish hatchery, to promote such interest. An Executive Council with overview responsibilities will be established for the project. A public awareness and outreach plan will be implemented to recruit minority students to undergraduate and graduate programs in marine science. (Anadu: R/MS-1)

- **An excellent way to accomplish this is through internships whereby students get hands-on experience with science. During the summer of 2002, six students applied for internships and four were selected. The four students (and their respective research projects) are:**
  - **Michaela Straker worked on the effect of Atrazine on the reproduction of the grass shrimp *Palaemonetes pugio,* under the mentorship of Dr. Michael Fulton and Dr. Ed Wirth. Sponsor: NOAA National Ocean Service – Center for Coastal Environmental Health and Biomolecular Research in Charleston, SC.**
  - **Franz Jones worked on the water quality requirements of the redbreast sunfish *Lepomis auratus* under the supervision of Willie Booker, Orangeburg National Fish Hatchery Manager. Sponsor: National Orangeburg Fish Hatchery.**
  - **Twana Powell worked on feed and growth rate of the endangered shortnose sturgeon *Acipenser brevirostrum* under the mentorship of Willie Booker, Orangeburg National Fish Hatchery Manager. Sponsor: National Orangeburg Fish Hatchery.**
  - **Ashley Zimmerman worked on the biology of the blue gilled sunfish *Lepomis macrochirus* under the supervision of Willie Booker, Orangeburg National Fish Hatchery Manager. Sponsor: National Orangeburg Fish Hatchery.**
- **An Executive Council was established to guide the project. It consists of all partners in the MSI initiative. The Council held its annual meeting in 2002 and determined that the project was succeeding in meeting its objectives. The public awareness and outreach plan continues, and the focus is on high school students, encouraging them to pursue college degrees in a science, preferably marine-related.**

9.2. Engage undergraduate and graduate student interns to assist SCSGC staff and SCSGEP specialists with applied research, education, communications, and extension projects. (Bacon, Whetstone, Sawyer, Turner, Judge, Jolly-Clair, Blackwell, Ferris)

- **Communications Interns:**
  - **Alexandra Simpson - College of Charleston Communications student, volunteer intern for Beach Sweep/River Sweep.**
  - **John Sonner - College of Charleston Communications student, volunteer intern for Beach Sweep/River Sweep.**
- **Sea Grant Extension Interns:**
  - **Steven O'Shields - College of Charleston student, interned for Turner and Sawyer for the SC NEMO program. O'Shields conducted his MS thesis following his internship. He was a graduate student in the Masters of Environmental Studies program. Sawyer served as a signatory on his**

graduate committee.
- **Erica Cunningham - College of Charleston (Master of Environmental Studies) interned for Bacon on a project assisting Dr. Tim Reinhold (Reinhold: R/CE-6; see Strategic Goal 4.1) in the identification and selection of coastal homeowners to participate in his hurricane retrofit research project.**
- **Christine Kozcera – interned with Bacon and Dwyer on a Sea Grant Extension Fishery Extension Enhancement project to link fishery genetics research to fishery management needs.**

- **Consortium Intern:**
  - **Susannah Sheldon – College of Charleston (Master of Environmental Studies) interned with the Executive Director and Assistant Director on a variety of research and administrative tasks.**

9.3. Through funding of research projects, provide research assistantship opportunities as well as internships for graduate and undergraduate students. Support twenty (20) such students during 2002. (Dwyer)
- **Supported 40 graduate students during 2002 – a 200% increase over goal. See Attachment #6.**

9.4. Solicit minimum of four applications for the Dean John A. Knauss Marine Policy Fellowship and secure one finalist from South Carolina for a Fellowship in either the executive or legislative branch of government. (Dwyer)
- **Received 5 applications and all were forwarded to the NSGO for consideration. Two candidates were selected as finalists and received fellowships in the executive branch of Federal government. See Attachment #7.**

9.5. Solicit minimum of two applications for Coastal Zone Management Fellowships and place one individual with a state Coastal Zone Management program. (Dwyer)
- **Received three applications. All three candidates received CZM Fellowships. See Attachment #7.**

9.6. Pursue possibilities for providing an Industrial Fellows opportunity through a partnership between the South Carolina Sea Grant Consortium and a private sector company. (Dwyer)
- **Insufficient time to devote to this objective. A greater effort will be made during the fourth quarter of 2004 to identify a candidate for Year 2005.**

9.7. SCSGC and SCSGEP staff will participate in professional development programs. (DeVoe, Knight, Bacon, Blackwell, Dwyer, Tibbetts, Snow, Ferris, Whetstone, Sawyer, Turner, Judge)
- **Blackwell and Snow attended a communicators network meeting, "Communications Matters" in Baton Rouge, LA.**
- **Snow participated in a panel discussion at the "Communications Matters" meeting. The topic was "Which Medium is Best for What Products/Audiences."**
- **Ferris participated in a S.C. Sea Grant-sponsored harmful algal bloom workshop and field trip.**
- **Snow, Tibbetts, and Blackwell conducted a site visit of the new *Coastal Heritage* printer, Major Printing.**
- **Ferris attended a NOAA/NOS biotoxins workshop on toxic algae and AVM.**

- **Ferris attended "The Four Connecting Points" PR workshop by Andy Goodman.**
- **Turner participated in the Coastal Management for Practitioners Training. The workshop's multi-topic curriculum was designed to provide practical skills and information to coastal managers on topics such as managing multiple disciplines, collaborative processes, the coastal management framework, and information survival skills.**
- **Turner completed the National Safety Council DDC-4 Defensive Driving Course, which is required for all state employees.**
- **Turner attended The Z Word: A Discussion of Zoning in the Upstate workshop hosted by Upstate Forever in Greenville, SC. The main purpose of this workshop was to address many of the important issues pertaining to zoning, one of the most controversial and misunderstood subjects in SC.**
- **Turner participated in a workshop Beta testing the interactive tutorial for the Build-A-Pivot (Performance Indicators Visualization and Outreach Tool) software application at NOAA CSC in Charleston. The PIVOT framework is designed to help assess the success of sustainable management actions for a particular project or program by combining visualization, Web technology, and spatial data.**
- **Turner participated in the Comprehensive Planning Workshop in Clemson, SC, sponsored by SCAPA Academy for Planning, and Clemson Advancement Foundation for Design and Building. The course focused on presentations/lectures and discussions about comprehensive planning history, themes, precedents and principles related to topics such as zoning; subdivision regulations; capital improvements programming; natural and cultural resources; urban design; land use legislation; and planning theory and ethics.**
- **Turner attended several training sessions for performance-based objective writing, conducted by NOAA/CSC staff. The goal of this training is to improve the ability of Extension agents to accurately and meaningfully measure the impacts and outcomes of their projects and products.**
- **Turner attended the Smart Growth in South Carolina: Strategies for Success Symposium in Charleston, SC, sponsored by the Urban Land Institute (ULI) and the SC Real Estate Center.**
- **Turner attended the Southeast Atlantic Coastal Ocean Observing System (SEA-COOS) Pre-Workshop Training in Charleston.**
- **Sawyer co-chaired Regional Extension Conference - Participants came from SC, NC, GA, FL, and AL to attend the conference, which was chaired by Sawyer and Bill Hunt, of the NC Cooperative Extension Service.**
- **Sawyer implemented the Best Management Practices (BMP) Academy in Charleston, SC on October 3 & 4, 2002. Over 50 engineers attended the short course, which was focused on which BMPs really work the best, which design techniques are most effective, and what site considerations have the greatest impact on design efficiency. Professional Engineers and Registered Land Surveyors from SC could claim 12 credit hours for the full two-day program, which was sanctioned by the SC Board of Labor and Licensing.**
- **Tidal Creek Watershed Management - Over 100 local and state officials attended the short course in Brunswick County, North Carolina. The training addressed important aspects of natural resource conservation and restoration. Sawyer's instruction also examined regional collaboration with NC State Cooperative Extension and N.C. Sea Grant.**
- **NC Coastal Federation - Provided 1/2 day seminar at the NC Coastal Federation Best Management Practices for Protecting Water Quality Workshop in New**

Bern, NC. Over 220 people attended this EPA sponsored event. The workshop was designed to help state and local government officials to more fully understand emerging stormwater management issues and requirements.

- **2002 SC DHEC Stormwater Workshop – At the request of SC DHEC, Sawyer presented findings from the SC Nonpoint Education for Municipal Officials program to workshop participants. Representatives from DHEC and various local governments attended this workshop to find out details about the upcoming Phase II requirements.**
- **SC DHEC Bureau of Water Joint Staff Meeting - At the request of DHEC Bureau of Water Chief, Sawyer provided a lecture covering ongoing activities of the SC Nonpoint Education for Municipal Officials program. Over 75 people attended a one-hour session covering aspects of site design, natural resource based planning, and implementation of best management practices.**
- **Edisto Island Open Land Trust Coastal Stewardship Seminar – Invited lecture to the membership of EIOLT on the merits of open land preservation with respect to water quality and quantity. Sawyer covered aspects of riparian buffers, watershed preservation, and best management practices.**
- **Palmetto Youth Leadership Lecture – Over 60 high school juniors were selected for their leadership potential and participate in the program for an entire year. Those in attendance were provided information on water quality issues facing the citizens of South Carolina in addition to a series of recommendations on actions they can take to minimize their impacts.**
- **SC Chapter of the American Society of Civil Engineers – Invited lecture on cost-benefit analysis of urban structural best management practices.**
- **Regional Water Quality Extension Programming – In November, Sawyer co-chaired the regional Extension training conference on stormwater in Wilmington, NC on behalf of Clemson University. This year's regional training was entitled Stormwater Phase II: Positioning Extension to Take the Lead. Over 60 Extension agents, specialists, and directors attended from around the Southeast states, including South Carolina, North Carolina, Georgia, Alabama and Florida. Twenty-two (22) Clemson Extension personnel attended all or part of the conference. The agenda covered numerous topics related to Phase II programming, including planning, education, and training opportunities. The conference culminated in a hands-on field trip where a bio-retention BMP was installed for the City of Wilmington Parks Department. Sawyer secured the funding for agent travel by obtaining an agreement from SC Extension Water Quality Leader Barbara Speziale (now John Hayes) to pay $4,000 of Section 406 money for related expenses. This money is set aside from USDA for use in regional training efforts.**

- **Knight attended and participated in the following:**
  - **Planning of the Ocean Commission Meeting held in Charleston in January 2002.**
  - **World Aquaculture Society meeting in San Diego.**
  - **Planning of the Sea Grant Association meeting held in Washington, DC.**
  - **NOAA Finance Officers meeting in Silver Spring, MD.**
  - **The Coastal Society 2002 Conference in Galveston, TX and was the registrar for the meeting.**
  - **LU-CES workshop in Spring Island.**
  - **2002 State Insurance Benefits Conference in Columbia, SC.**
  - **National Shellfisheries Association (NSA) meeting in Maine and participated in the International Conference on Shellfish Restoration (ICSR) planning meeting.**

- **South Carolina Government Finance Officers meeting in Myrtle Beach, SC.**
- **Oceans'02 meeting and participated in planning the Sea Grant Association fall meeting held in conjunction with the Oceans02 meeting in Santa Barbara, CA.**
- **ICSR meeting held in Charleston, SC (November 2002) and was involved in meeting and registration planning.**

Attachment #1. S.C. Sea Grant Consortium Annual Programmatic Budgets

Source of Funds	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Core Sea Grant	1,191,210	1,254,000			
Sea Grant - Knauss Fellows	38,000	38,000			
Sea Grant - Industrial Fellows					
Theme Team - Coastal Hazards	15,000	15,000			
Sea Grant NSI - Coast Commun		50,000			
Sea Grant - Fisheries Extension					
Sea Grant NSI - Reinhold		85,000			
Sea Grant NSI - MSI	45,000	45,000			
Sea Grant NSI - Brune		208,200			
Sea Grant NSI - Black Sea Bass	80,186	300,000			
Sea Grant NSI - Cobia		60,459			
Sea Grant NSI - Coral Reefs	125,000				
Sea Grant NSI - Oyster JOD		60,029			
Sea Grant Media Relations	189,828	195,014			
Sea Grant Abstracts	91,900	98,952			
Sea Grant NSI, Media - Other	176,893	249,575			
FISHTEC (NOAA/NOS)	388,500	388,500			
USES (NOAA/NOS)	697,320	698,744			
LU-CES (NOAA-NOS)	600,000	1,200,000			
Georgia SG (for LU-CES)					
NOAA/NOS/COP - Other					
Coastal Erosion (USGS)	500,000	500,000			
113 Calhoun Street (FEMA)					
113 Calhoun Street (NOAA)	30,000	30,000			
S.C. Aquarium (NOAA)	167,580				
NOAA CSC Fellows					
NOAA CSC Grants					
NOAA Ship Time					
NCRI					
HABs (CDC thru DHEC)	11,082	4,000			
HABs (NOAA thru SCDNR)	26,175	25,390			
NEMO (EPA thru DHEC)	57,237	57,237			
NEMO (EPA thru BCD-COG)		2,833	2,833	2,833	
SECOSEE (NSF)					
SEA-COOS (ONR thru NCSU)					
Beach Sweep/River Sweep	20,000	15,000			
Other Contributions					
TOTAL OTHER FUNDS	**4,450,911**	**5,580,933**			
State Appropriation	**650,757**	**524,638**			
TOTAL FUNDS	**5,101,668**	**6,105,571**			

Source of Funds	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000
Core Sea Grant	1,099,900	896,454	1,169,000	1,169,000	1,169,000
Sea Grant - Knauss Fellows	36,000		36,000	72,000	36,000
Sea Grant - Industrial Fellows			27,383	27,286	
Theme Team - Coastal Hazards					
Sea Grant NSI - Coast Commun					
Sea Grant NSI - Reinhold					
Sea Grant NSI - MSI					
Sea Grant NSI - Brune					
Sea Grant NSI - Black Sea Bass					80,186
Sea Grant NSI - Cobia					
Sea Grant NSI - Coral Reefs					
Sea Grant NSI -					
Sea Grant – Enhance. Grants	203,174				
Sea Grant Media Relations					
Sea Grant Abstracts					
Sea Grant NSI, etc. - Combined		325,222	470,821	352,324	355,324
FISHTEC (NOAA/NOS)	432,891	586,000	388,500	388,500	388,500
USES (NOAA/NOS)	700,000	700,000	700,000	700,000	700,000
LU-CES (NOAA-NOS)			50,000	175,000	600,000
Georgia SG (for LU-CES)		3,075	3,600		
NOAA/NOS/COP - Other	91,269	27,000	49,062		
Coastal Erosion (USGS)	249,005	254,000	349,500	224,500	750,000
113 Calhoun Street (FEMA)	26,800	100,484	150,404	150,000	
113 Calhoun Street (NOAA)					
S.C. Aquarium (NOAA)		13,000			322,420
NOAA CSC Fellows			74,000	300,000	
NOAA CSC Grants	106,335	329,466	200,000	137,500	
NOAA Ship Time	70,000	100,000	100,000	70,000	
NCRI	32,605	35,039			
HABs (CDC thru DHEC)					8,000
HABs (NOAA thru SCDNR)					
NEMO (EPA thru DHEC)			43,020		
NEMO (EPA thru BCD-COG)					
Beach Sweep/River Sweep		20,000	12,191		
Other Contributions		5,472			12,000
TOTAL OTHER FUNDS	**3,047,979**	**3,395,212**	**3,823,481**	**3,766,110**	**4,421,430**
State Appropriation	**487,416**	**496,516**	**528,265**	**575,195**	**591,536**
TOTAL FUNDS	**3,535,395**	**3,891,728**	**4,351,746**	**4,341,305**	**5,012,966**

Source of Funds	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995
Core Sea Grant	797,000	779,000	946,500	927,000	1,124,897
Sea Grant - Knauss Fellows	30,000	0	60,000	30,000	0
Sea Grant - Industrial Fellows					
Theme Team - Coastal Hazards					
Sea Grant NSI - Coast Commun					
Sea Grant NSI - Reinhold					
Sea Grant NSI - MSI					
Sea Grant NSI - Brune					
Sea Grant NSI - Black Sea Bass					
Sea Grant NSI - Cobia					
Sea Grant NSI - Coral Reefs					
Sea Grant NSI -					
Sea Grant – Enhance. Grants					
Sea Grant Media Relations					
Sea Grant Abstracts					
Sea Grant NSI, etc. - Combined				2,500	97,749
FISHTEC (NOAA/NOS)	12,000	5,000	201,000	352,800	566,001
USES (NOAA/NOS)					
LU-CES (NOAA-NOS)					
Georgia SG (for LU-CES)					
NOAA/NOS/COP - Other		137,601	100,684	70,426	86,233
Coastal Erosion (USGS)				247,538	247,538
113 Calhoun Street (FEMA)					
113 Calhoun Street (NOAA)					
S.C. Aquarium (NOAA)					
NOAA CSC Fellows					
NOAA CSC Grants	43,860			45,000	15,141
NOAA Ship Time	80,000	77,000	40,000	40,000	70,000
NCRI		55,701	13,076		70,922
HABs (CDC thru DHEC)					
HABs (NOAA thru SCDNR)					
NEMO (EPA thru DHEC)					
EMAP (EPA)	10,000		79,999	212,691	
SC DHEC		17,000			
SC Water Resources Comm.	15,000	10,000			
College of Charleston (LS $$)		10,674	18,000	19,039	
Coastal Council	15,000		10,000		
City of Charleston (CPW)	62,000	65,000	67,818		
Beach Sweep/River Sweep				8,390	9,608
Other Contributions	46,360	44,981	13,242	13,000	10,000
TOTAL OTHER FUNDS	**1,111,220**	**1,201,957**	**1,550,319**	**1,968,384**	**2,298,089**
State Appropriation	**518,092**	**492,071**	**482,363**	**490,885**	**503,860**
TOTAL FUNDS	**1,629,312**	**1,694,028**	**2,032,682**	**2,459,269**	**2,801,949**

Attachment #2. S.C. Sea Grant Consortium PROGRAM GRANTS 2001-2002 Update

Program Management, Research and Outreach

- "S.C. Sea Grant College Core Program" – NOAA National Sea Grant College Program – $1,114,200 – March 1, 2001 to February 28, 2002 (continuing) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "S.C. Sea Grant College Program – Merit Funding" – NOAA National Sea Grant College Program – $140,000 – March 1, 2001 to February 28, 2002 (Year 1 of 4) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "S.C. Sea Grant College Core Program – Supplement" – NOAA National Sea Grant College Program – $21,000 – September 1, 2001 to February 28, 2002 (continuing) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "National Sea Grant Knauss Marine Policy Fellowship Program" – NOAA National Sea Grant College Program – $38,000 – February 1, 2001 to January 31, 2002 – M. Richard DeVoe (S.C. Sea Grant Consortium) – [University of South Carolina]

- "The *Communicator*: Creating a More Cohesive and Informed Sea Grant Network Through an Educational Newsletter for Internal Audiences – Phase IV" – NOAA National Sea Grant College Program – $46,250 - September 1, 2001 to February 28, 2002 (Year 4 of 4) – Linda J. Blackwell (S.C. Sea Grant Consortium).

- "Sea Grant National Media Relations Project" – NOAA National Sea Grant College Program - $193,619 – March 1, 2001 to February 28, 2002 (Year 3 of 4) – Linda J. Blackwell (S.C. Sea Grant Consortium).

- "Sea Grant Abstracts" – NOAA National Sea Grant College Program – $91,900 – March 1, 2001 to February 28, 2002 (Continuing) – F. Shephard (WHOI).

- "Support for Beach Sweep/River Sweep '00 Activities" – Private Donations – ~$20,000 - September 2001 – Linda J. Blackwell (S.C. Sea Grant Consortium).

Coastal Ocean Studies

- "South Atlantic Bight Land Use – Coastal Ecosystem Study (LU-CES)" – NOAA Coastal Ocean Program Office – $1,200,000 – July 1, 2001 to June 30, 2002 (Year 2 of 5) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "Urbanization and Southeastern Estuarine Systems (USES)" – NOAA Coastal Ocean Program – $698,744 – August 1, 2001 to July 31, 2002 (Year 12 of 13) – F. John Vernberg (University of South Carolina).

Ecosystem Dynamics

- "Molecular and Pathobiology Studies to Identify the Causitive Agent of Juvenile Oyster Disease" – NOAA National Sea Grant College Program – $ 60,290 – October 1, 2001 to September 30, 2002 (Year 1 of 2) – Cheryl M. Woodley and Eric R. Lacy (Medical University of South Carolina).

Climate and Hazards

- "Establishing the Operational and Management Functions of 113 Calhoun Street: A Center for Sustainable Living" – NOAA/NOS Coastal Services Center – $90,000 – September 1, 2000 to August 31, 2002 (Year 1 [Extended] of 1) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "SC/GA Coastal Erosion Study - Phase II" – U.S. Geological Survey – $500,000 – September 1, 2000 to August 31, 2002 (Year 2 of 5) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "National Sea Grant Coastal Hazards Theme Team" – NOAA National Sea Grant College Program – $15,000 – March 1, 2001 to February 28, 2002 (Year 2 of 3) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "Sea Grant Technology Program Initiative to Accelerate Implementation of Retrofit Measures for Improving the Wind Resistance of Houses" – NOAA National Sea Grant College Program – $85,000 – October 1, 2001 to September 30, 2002 (Year 1 of 1) - Timothy A. Reinhold (Clemson University)

Marine Biotechnology

- "Cooperative Program in Fisheries Molecular Biology (FISHTEC)" – NOAA National Ocean Service – $388,500 – September 1, 2001 to August 31, 2002 (Year 9 of 12) – M. Richard DeVoe (S.C. Sea Grant Consortium).

- "Examination of Altered Gene Expression in the Mummichog (*Fundulus heteroclitus*) Due to Chronic Exposure to Estuarine Pollutants" – NOAA National Sea Grant College Program – $124,575 – September 1, 2001 to August 31, 2002 (Year 2 of 2) – Lisa J. Bain et al. (University of Texas - El Paso [formerly of Clemson University]).

- "Environmental Marine Biotechnology – Assessing the Health of Coral Reef Ecosystems in the Florida Keys Using an Integrated Molecular Biomarker System" – NOAA National Sea Grant College Program – $125,000 – September 1, 2001 to August 31, 2002 (Year 2 of 2) - Cheryl M. Woodley & Eric R. Lacy (Medical University of South Carolina).

Sustainable Economic Development

- "Development of Reliable Spawning, Nursery, and Juvenile Production Techniques for Commercialization of Black Sea Bass Aquaculture" – NOAA National Sea Grant College Program – $300,000 – September 1, 2001 to August 31, 2002 (Year 1 of 2) – Theodore I.J. Smith (S.C. Department of Natural Resources).

- "Engineered Ecosystems for High Rate Sustainable Marine Shrimp and Bivalve Production" – NOAA National Sea Grant College Program – $208,200 – September 1, 2001 to August 31, 2002 (Year 1 of 2) – David E. Brune (Clemson University).

- "Development of Cobia Culture in the United States" – NOAA National Sea Grant College Program - $60,459 – September 1, 2001 to August 31, 2002 (Year 1 of 2) – Theodore I.J. Smith (S.C. Department of Natural Resources).

- "Addressing the Challenges of Coastal Growth in South Carolina: A S.C. Sea Grant Consortium Initiative" – NOAA National Sea Grant College Program – $50,000 – September 1, 2001 to August 31, 2002 – M. Richard DeVoe (S.C. Sea Grant Consortium).

Marine Education

- "SG-MSI Partnership Program: Strategic Partnership to Enhance Experiential Learning in Marine Sciences" – NOAA National Sea Grant College Program – $45,000 – October 1, 2000 to September 30, 2001 (Year 1 of 3) – Donald I. Anadu (South Carolina State University).

Training and Outreach

- "Implementation of a Nonpoint Education for Municipal Officials Program" – S.C. Department of Health and Environmental Control – $60,209 – July 1, 2001 to June 30, 2002 (Year 2 of 3) – M. Richard DeVoe (S.C. Sea Grant Consortium)

Attachment #3. S.C. Sea Grant Consortium STAFF LEADERSHIP ACTIVITIES 2001-2002 Update

Leadership Activities – Agency Head

Selected activities of the Agency Head include:

State Activities

- Organized and chairs the South Carolina Task Group on Harmful Algae, an organization of state and federal agencies, universities and others to develop strategies to deal with harmful algae blooms.
- Serves on the Advisory Board of the Water Resources Center, Strom Thurmond Institute, Clemson University.
- Continues to serve as a member of the Board of the Lowcountry Institute, Spring Island. S.C.
- Serves as Vice President of the 113 Calhoun Street Board of Directors.
- Member, Management Committee, State of the Harbor – Charleston Harbor Project (under the auspices of SCDHEC/OCRM)
- Established a coastal and ocean research discussion group (with representatives of SCMRD, University of South Carolina, Clemson University, Coastal Carolina University, University of Charleston, SC, and NOAA/NOS-Charleston Laboratory to explore the development of a coordinated state coastal and ocean research strategy.
- Invited Finals Moderator, South Carolina-Georgia Regional National Ocean Sciences Bowl competition, Columbia, S.C., March 2, 2002.
- Invited Moderator, Transportation Panel, Governor's Summit on Growth, Columbia, SC, March 3-5, 2002.
- Invited Participant, President's Summit on Public Service, Clemson University, April 23, 2002.
- Appointed Adjunct Faculty Member with the Marine Environmental Studies Graduate Program at the Graduate School of the College of Charleston on April 25, 2002.

National Activities

- Serves as President of the national Sea Grant Association (SGA), a federation of the 30 Sea Grant College Programs located in every coastal and Great Lakes state.
- Co-chair of the National Sea Grant Theme Team on Coastal Natural Hazards, one of nine national planning groups made up of scientists, extension specialist, educators, and government representatives charged with developing the national Sea Grant agenda for this and other topics.
- Organized and hosted Sea Grant Week 2001, a biennial conference of the Sea Grant Association with participation of the National Sea Grant Office and the National Sea Grant Review Panel, on Hilton Head Island in March 2001. Mr. Scott Gudes, Acting Administrator of NOAA, was a keynote speaker.
- Invited member of the North Carolina Sea Grant College Program External Review Panel, North Carolina State University, September 25-27, 2001.

- Organized and held a retreat for the SGA Executive Board to discuss operating vision and principles, St. Louis, MO, October 23-25, 2001. Vision and principles subsequently approved unanimously by SGA delegates in March 2002.
- Formal participant, as SGA president, of the National Sea Grant Review Panel (NSGRP), a FACA-approved committee charged with overseeing the National Sea Grant College Program office. The NSGRP reports to the Secretary of the U.S. Department of Commerce. Most recently attended and reported at NSGRP meeting, Silver Spring, MD, November 8-9, 2001.
- Formal member, as SGA President, of the Coastal Coordination Committee, a group comprised of the Acting Assistant Administrator of NOAA's National Ocean Service, the National Sea Grant College Program Director, the Executive Director of the Coastal States Organization, among others, whose goal is to integrate program activities across NOAA.
- Invited panelist, on behalf of the SGA, before the southeastern regional meeting of the U.S. Commission on Ocean Policy, Charleston, S.C., January 16, 2002.
- Invited Moderator of the Formal Education Panel of the Capitol Hill Oceans Week event, Washington, D.C., June 5-6, 2002.

Other Activities

- Served (2000-2001) as Program Chairman for the international Aquaculture 2001 Triennial Conference and Trade Show, attended by more than 3,500 people. Invited speaker and author in a special session on responsible aquaculture.
- Co-convened and presented a special poster session at the regional Geological Society of America conference on April 3-5, 2002 with the research team of the Consortium's Coastal Erosion Study (funded by the U.S. Geological Survey).
- Co-founder and co-chair of the International Conference on Shellfish Restoration (ICSR). ICSR'02 is scheduled for November 20-24, 2002 in Charleston, S.C.; ICSR'00 was held November 14-18, 2000 on Hilton Head Island, with over 200 participants.
- Co-chair of the Southeast Coastal Ocean Science Conference and Workshop, being organized by the Consortium, the NOAA Coastal Services Center, the College of Charleston, and others, scheduled for Fall, 2003.

1.3. Leadership Activities - Consortium Staff

- Employees are encouraged to join and actively participate in professional organizations. Examples include:

Local Activities

- Charleston 2000 Plan – chair, Economic Development Committee
- Charleston Tourism Commission – chair, Long-Range Planning
- Charleston Area Small Business Development and Resource Network – founding member
- Charleston County World of Wonders Family Science Program – instructor
- Beaufort County Stormwater Ordinance Advisory Committee – co-chair; staff
- Fort Johnson Seminar Series – committee member
- Maritime Association of the Port of Charleston – member

- Nonpoint Education for Municipal Officials – program coordinator
- S.C. Native Plant Society – member Lowcountry chapter
- Wind-Aid Program – Coordinator (2001)
- Winyah Bay Task Force – Technical Committee

State Activities

- S.C. Aquaculture Association – charter member and advisor
- S.C. Shrimp Growers Association – advisor
- S.C. DHEC/DNR Mariculture Regulatory Committee – member
- S.C. Dept. of Health and Environmental Control – member, Nonpoint Source Task Force
- S.C. Farm Bureau – adviser, Aquaculture Commodities Committee
- ACE (Ashepoo-Combahee-Edisto) Basin Economic Forum – member
- North Inlet-Winyah Bay National Estuarine Research Reserve – member, Advisory Board
- Clemson University Extension Senate – President-Elect (1998-99); President (1999-00)
- Clemson/SCDNR Cooperative Fisheries Unit - coordinator
- Clemson Extension, Natural Resources Initiative Team – member
- S.C. Governmental Finance Officers – member
- S.C. Rural Economic Development Council – member
- S.C. Nature-Based Tourism Association Annual Conference – Program Chair (1994-99), Technical Advisory Board (1994-01)
- S.C. Flood Hazard Mitigation Planning Committee – member (1998-99)
- S.C. Information Resources Council – member, Standing Committee on Geographic Information
- S.C. Mapping Advisory Committee – member
- S.C. Marine Educators Association – member
- S.C. Economic Development Association – member
- S.C. Chapter, American Planning Association – member
- S.C. DNR Marine Advisory Committee, Disease Introductions Subcommittee – advisor
- S.C. Association of Environmental Professionals – member
- S.C. Marine Educators Association – Board member (1998); newsletter editor (1997-98)
- Leadership, South Carolina – graduate, Class of 2001
- Coastal Pesticide Advisory Council (CPAC) – on-going member
- S.C. Task Group on Toxic Algae – member
- S.C. Aquatic Plant Management Society Board of Directors (2001)
- SCDNR Natural Resources-Aquaculture Legislation Committee (2000-01)
- SCDNR Exotic Species Introductions Sub-Committee
- South Carolina Aquarium – Technical Committee (2000-01)
- International Conference on Shellfish Restoration Committee, co-chair (2001-2002)
- S.C. Government Webmasters Association (2002)
- S.C. Harmful Algae Task Force, communications officer (2001-2002)
- Fiscal Manager, *113 Calhoun Street*

National and Regional Activities

- Coastal Zone '01 Conference – Planning Committee, presenter (2001)

- Atlantic States Marine Fisheries Commission – Aquaculture Committee
- Southern Task Force on Wetlands and Endangered Species Issues, Cooperative Extension Service – member
- National Marine Educators Assn. – member
- National Marine Educators Assn. – logistical coordinator and registrar, 1999 Conference
- National Sea Grant Extension Program Leaders – Southeast Region, past-chair serving on Executive Committee (present)
- National Sea Grant Extension Assembly – Natural Hazards Initiative Chair (1995-99); Chair-elect (1999-2000)
- Sea Grant Week Conference – Logistical coordinator and registrar (2001)
- Assembly of Sea Grant Extension Program Leaders (ASGEPL) – Executive Committee, Chair (2001)
- National Publications Task Force, chair (2001-2002)
- National Communicator's Steering Committee (2001-1002)
- National Hazards Theme Team (2001-2002)
- National Media Relations Advisory Committee (2001-2002)
- Sea Grant National Web Committee (2002)
- Southeastern Estuarine Research Society – member
- Society of Research Administrators – member
- Sea Grant Association – fiscal officer
- International Personnel Managers Association – member
- The Coastal Society – registrar (2000)
- Sea Grant Finance Officers – Chair (1999 & 2000)

Attachment #4. S.C. Sea Grant Consortium PUBLICATIONS LISTING 2002 Update

- 1/02, designed and produced 3,500 First Announcements for the International Conference on Shellfish Restoration (ICSR'02)
- 1/02, Designed registration form for Eastern United States Interstate Shellfish Seed Transport Workshop
- 1/02, *Coastal Heritage*, Vol. 16, No. 3, Winter 2001, "Triumph of the Weed"
- 1/02, Designed and produced executive fact sheet "South Carolina Sea Grant: Science Serving South Carolina's Coast"
- 1/02, Designed and produced two posters for display at the reception for The U.S. Commission on Ocean Policy meeting in Charleston SC.
- 1/02, Designed and produced 500 envelopes for the Sea Grant Association.
- 2/02, Designed and produced agenda for Eastern United States Interstate Shellfish Seed Transport Workshop
- 2/02, Produced nametags for Eastern United States Interstate Shellfish Seed Transport Workshop
- 2/02, Created Web section for International Conference on Shellfish Restoration (ICSR 2002).
- 2/02, Produced glass award for the 2001 South Carolina Environmental Awareness Award.
- 2/02, Designed and produced the fact sheet "On the Proposal to Authorize the NOAA Coastal Ocean Program as part of the NOAA National Sea Grant College Program: Position Statement, February 1, 2002" for the Sea Grant Association.
- 2/02, Designed and produced the fact sheet "On the Proposal to Transfer the National Sea Grant College Program from NOAA, U.S. Department of Commerce to the National Science Foundation ; Position Statement, February 5, 2002"
- 3/02, Produced one pager for the S.C. Task Group on Harmful Algae.
- 3/02, *South Carolina Task Group on Harmful Algae*, Vol. 4, No. 1, Spring 2002
- 3/02, Recreated illustration of upwelling platform for Power Point presentation.
- 3/02, Created an electronic Project Report form.
- 3/02, Produced award plaques for the Sea Grant Association.
- 4/02, *Coastal Heritage*, Vol. 16, No. 4, Spring 2002, "Where have all the joiners gone?"
- 4/12/02, Produced fact sheet for aquaculture study, "Governing Offshore Aquaculture: Issues and Policies"
- 4/02, Produced S.C. Sea Grant note pads.
- 5/02, Produced nametag shells for the International Conference on Shellfish Restoration (ICSR'02)
- 5/02, Reprinted 1,500 113 Calhoun Street marketing brochure.
- 5/02, Designed and produced color name badges for the Coastal Society meeting.
- 5/02, *Inside Sea Grant*, Vol. 6, No. 1, Summer 2002, "Consortium receives National Sea Grant award for 2002-2003
- 5/02, Produced special four-color, two-sided business cards for Jennifer Jolly Clair.
- 6/02, Designed and printed 3,500 ICSR'02 Second Announcements.
- 6/02, Produced additional business cards for John Dwyer.
- 6/02, Produced updated Sea Grant letterheads.

- 7/02, *Coastal Heritage*, Vol. 17, No. 1, Summer 2002, "Floyd Follies: What We've Learned"
- 7/02, Designed and printed 5,000 113 Calhoun rack cards.
- 7/02, Designed and produced S.C. Sea Grant pocket folder.
- 7/02, Designed and produced SGA business cards for J. Greenamoyer.
- 8/02, Designed and produced "Stormwater BMP Academy" registration brochure.
- 8/02, Revised and reprinted "Of Sand and Sea: Teachings From the Southeastern Shoreline"
- 9/02, Designed and produced "Stormwater BMP Academy" notebook covers and spines.
- 9/02, Designed print template for *Coastal Heritage Curriculum Connection*
- 9/02, Created new Web section for *Coastal Heritage Curriculum Connection*
- 9/02, 2002 BS/RS t-shirts
- 9/02, 2002 BS/RS frisbies
- 9/02, 2002 BS/RS pocket koozies
- 9/02, Designed and produced the *National Sea Grant College Program Biennial Report, 2000-2001*
- 10/02, Produced hats for the International Conference on Shellfish Restoration
- 10/02, Produced koozies for the International Conference on Shellfish Restoration
- 10/02, Reprinted NEMO pocket folders.
- 10/02, *Coastal Heritage,* Vol. 17. No. 2, Fall 2002 "Rise and Fall and Rise… South Carolina's Maritime History"
- 10/02, Designed and produced survey cards for *Coastal Heritage's* biennial purge.
- 10/02, Produced nine award plaques for the Sea Grant Association.
- 10/02, Produced SGA envelopes.
- 10/02, Produced SGA letterheads.
- 11/02, Produced 200 conference notebooks for the International Conference on Shellfish Restoration
- 11/02, Produced the FY03-04 Omnibus Proposal
- 11/02, Produced business cards for Robinson
- 12/02, SourhEastern Coastal Ocean Science (SECOS), produced hats for conference and workshop.
- 12/02, *South Carolina Task Group on Harmful Algae*, Vol. 4, No. 2, Fall 2002
- 12/02, *Inside Sea Grant*, Vol. 6, No. 2, Winter 2002, "Volunteers clear away tons of trash"

Attachment #5. S.C. Sea Grant Consortium
SELECTED S.C. SEA GRANT EXTENSION PROGRAM WORKSHOPS AND PRESENTATIONS
2002 Update

I. Aquaculture and Pond Management

- "Update and Evaluation of Proposed New NPDES Regulations on Marine Shrimp Aquaculture in the US" – Presentation. US Joint Subcommittee on Aquaculture's Aquaculture Effluents Taskforce Workshop on NPDES Regulations. Washington, DC.

- "Existing Water Quality Requirements, NPDES Permits and Shrimp Water Quality Management" – Presentation. USEPA public hearing on new proposed NPDES regulations on aquaculture effluents. Washington DC.

- "Demonstration of Aquatic Weed Control by Tilapia in South Carolina Irrigation Ponds" – Presentation. Aquatic Plant Management Society. Keystone, CO.

- "Outdoor Tank and Pond Spawning of Wild Caught Cobia (*Rachycentron canadum*) in South Carolina" – Presentation. US Chapter – World Aquaculture Society. San Diego, CA.

- "Double Crop Pond Management Strategy Using *Litopenaeus vannamei* in South Carolina" – Presentation. US Chapter – World Aquaculture Society. San Diego, CA.

- "Aquaculture Discharge Regulations" – Panelist. US Chapter of the World Aquaculture Society. San Diego, California.

- "Shellfish Seed Transport – An Industry Perspective" – Presentation. East Coast Shellfish Seed Transport Workshop. Charleston, SC

- Shellfish Industry Panel Discussion – Chair. East Coast Shellfish Seed Transport Workshop. Charleston, SC

- "2002 USDA Non-Insured Agricultural Products Insurance Program and the USEPA Regulatory Review of Aquaculture Discharge NPDES Permits" – Presentation. The South Carolina Shrimp Growers Association.

- "Integrated Pest Management for Aquatic Weed Control" – Presentation. Grand Strand Golf Course Superintendents Association. Myrtle Beach, SC

- "SC Shellfish Aquaculture" – Presentation. South Carolina Shellfish Management and Law Enforcement Workshop. Columbia, SC

- "Demonstration of Aquatic Weed Control by Tilapia in South Carolina Irrigation Ponds" – Demonstration. Clemson University Turfgrass Field Day. Clemson, SC

- "Pond Management in South Carolina" – Radio presentation. "Your Day" radio program on the SC Educational Radio Network.

- "Water Quality Parameters Effecting Aquatic Weed Control" – Presentation. Carolinas Golf Course Superintendents Association Annual Conference. Myrtle Beach, SC.

- "Prevention, Mechanical, and Biological Control" – Presentation. Carolinas Golf Course Superintendents Association Annual Conference. Myrtle Beach, SC.

- "Management of Golf Courses to Reduce Aquatic Weed Problems" – Presentation. Carolinas Golf Course Superintendents Association Annual Conference. Myrtle Beach, SC

- "Water Quality in Recreational Fish Ponds" – Presentation. Beaufort-Hampton-Jasper County Pond Clinic. Beaufort, SC.

- "Liming Recreational Fish Ponds" – Demonstration. Beaufort-Hampton-Jasper County Pond Clinic. Beaufort, SC

- "Fertilizing in Recreational Fish Ponds" – Demonstration. Beaufort-Hampton-Jasper County Pond Clinic. Beaufort, SC

- "Aquatic Weed Control in Recreational Fish Ponds" - Presentation. Beaufort-Hampton-Jasper County Pond Clinic. Beaufort, SC

- "Water Quality in Recreational Fish Ponds" – Presentation. Charleston County Farm Pond Clinic. Charleston, SC

- "Liming and Fertilizing Recreational Fish Ponds" – Presentation. Charleston County Farm Pond Clinic. Charleston, SC

- "Stocking and Harvesting Recreational Fish Ponds" – Presentation. Charleston County Farm Pond Clinic. Charleston, SC

- "Aquatic Weed Control, Identification, and Aquatic Weed Integrated Pest Management" – Presentation. Charleston County Farm Pond Clinic. Charleston, SC

- "Aquaculture and Nuisance Aquatic Plant Management Programming" – Presentation. Clemson University Water Quality Symposium. Clemson, SC

- "Recreational Fish Pond Stocking and Harvesting Management" – Presentation. Sumter County Recreational Fish Pond Clinic. Sumter, SC

- "Aquatic Weed Identification and Control" – Presentation. Sumter County Recreational Fish Pond Clinic. Sumter, SC

- "Demonstration of Tilapia for Aquatic Weed Control in South Carolina Irrigation Ponds" –

South Carolina Aquatic Plant Management Society.

- Pond Management Workshop. Belle Isle Property Owners Association. Georgetown, SC

II. Coastal Communities and NEMO

- Non-Point Source Education for Municipal Officials (NEMO). Twenty-four (24) invited NEMO presentations (elected and appointed municipal officials, citizen groups, chambers of commerce, civic associations, local, state, and federal government organizations, university partners, state, regional, and national conferences). Over 500 attendees, 4 local newspaper articles.

- "SC NEMO Program Project Update" – Presentation. Second NEMO University Conference. Charleston, SC. There were 65 attendees from 25 states, representing 20 of the 23 National NEMO Network projects from around the country.

- SC NEMO Program Overview – Poster presentation. 11th Annual SC Environmental Symposium. Myrtle Beach, SC. Approximately 200 people attended the event.

- "Introduction to the SC NEMO Program" – Presentation. SC Chapter of the American Planning Association. Columbia, SC. Approximately 50 people attended.

III. Environmental Quality

- Coast-A-Syst. Seven (7) invited presentations have been made on behalf of the Coast-A-Syst program (local, state, and federal government organizations, citizen groups, civic associations, university partners, state, regional, and national conferences). Over 220 attendees.

- "Sound Coastal Stewardship" – Presentation. NC Coastal Federation Best Management Practices for Protecting Water Quality Workshop. New Bern, NC. Over 220 people attended this EPA-sponsored event.

- "Stormwater Best Management Practices" – Presentation. Tidal Creek Restoration Workshop. Brunswick, NC. Over 100 local and state officials attended the workshop, which addressed important aspects of natural resource conservation and restoration.

- "Innovative Site Design" – Presentation. Joint Staff Meeting of the DHEC Bureau of Water. Columbia, SC. Over 75 people attended.

- "Water Quality for the Home Landscape" – Presentation. Charleston Home and Garden Show. Charleston, SC

- "Water Quality Exhibit" – Presentation. Beaufort County Clean Water Celebration Day. Beaufort, SC. Over 200 people attended the event.

- "Stormwater Phase II: Positioning Extension to Take the Lead" – Presentation. Regional Extension Stormwater Training Conference. Wilmington, NC. Over 60 Extension agents, specialists, and directors attended from around the Southeast states, including South Carolina, North Carolina, Georgia, Alabama and Florida.

- "Urban Stormwater Best Management Practices" – Presentation. SC Chapter of the American Society of Civil Engineers. Charleston, SC. 50 people attended.

- The Best Management Practices (BMP) Academy – Shortcourse. Organizer and presenter. Charleston, SC. Over 50 engineers attended.

- "The Merits of Open Land Preservation with Respect to Water Quality and Quantity" – Presentation. Edisto Island Open Land Trust Coastal Stewardship Seminar. Edisto Island, SC.

- "Water Quality Issues Facing the Citizens of South Carolina" – Presentation. Palmetto Youth Leadership Conference. Over 60 high school juniors attended. Charleston, SC.

- Land-Use – Coastal Ecosystem Study (LU-CES) Program Overview – Poster presentation. LU-CES/Beaufort Special Area Management Plan Joint Meeting. Spring Island, SC. Over 100 people attended the event, including elected and appointed officials, local, state and federal agency folks, and non-profit and citizen organizations.

- "Innovative Site Design Principles for Residential and Commercial Development" – Workshop presentation. Anderson County Council, Planning Commission and county staff members. Anderson, SC. Approximately 25 people attended.

IV. Coastal Ecosystem Health

- Harmful Algal Bloom Workshop – Organizer. NOAA Center for Coastal Environmental Health and Biomolecular Research (CCEHBR). Charleston, S.C.

- "Best Management Practices to Protect Pond Water Quality" – Presentation. Harmful Algal Bloom Training. NOAA Center for Coastal Ecosystem Health and Biomolecular Research (CCEHBR). Charleston, SC. Over 50 people attended.

Attachment #6. S.C. Sea Grant Consortium STUDENTS SUPPORTED BY PROGRAMS AND PROJECTS 2002

Project #	Name	Institution	Degree
E/O-16	Stephen Schabel	Charleston	M.S. Environmental Studies
E/R-16	Michelle Alford	USC	M.S. Public Health
	Purwasto Saroprayogi	USC	M.S. Earth and Environmental Resource Management
	Bryan Olson	USC	B.S. Marine Sciences
	Jay Kalahashty	USC	M.S. Computer Science
E/R-20	Jay Kalahashty	USC	M.S. Computer Science
P/M-2e	Christina Bird	Duke	M.S. Environmental Mgmt.
P/M-2p	Zachary Hart	Charleston	M.S. Environmental Studies
P/M-2u	Jennifer Emblidge	Charleston	M.S. Marine Biology
Q46B/Q46K	Jen Coor	CCU	B.S. Marine Science
	Matt Starr	CCU	B.S. Marine Science
	Bob Pender	CCU	B.S. Marine Science
	Jamie Phillips	CCU	B.S. Marine Science
	Katie Moses	CCU	B.S. Marine Science
	Kristen Headley	CCU	B.S. Marine Science
	Ty Hesser	CCU	B.S. Marine Science
Q46C	Benjamin Guttierez	USC	PhD Geological Sciences
Q46E	Huseyn Demir	Georgia Tech	PhD Civil/Env. Engineering
Q46F/Q46H	Jennifer Kuykendall	CCU	B.S. Marine Science
	Kathleen Moses	CCU	B.S. Marine Science
	Shelley Poteet	CCU	B.S. Marine Science
	Heather Young	CCU	B.S. Marine Science
	Jennifer Schertzer	CCU	B.S. Marine Science
	Meghan Willis	CCU	B.S. Marine Science
Q46G	Dany Pase	CCU	B.S. Marine Science
	Jason Ferrante	CCU	B.S. Marine Science
	Ryan Day	CCU	B.S. Marine Science
	Brandon Kramer	CCU	B.S. Marine Science
Q46I	Kyle Kelso	Charleston	B.S. Geology
	Tom Putney	Charleston	M.S. Environmental Studies
Q46J	Anna Austin	GSU	B.A. Geology
	Peter Dolan	GSU	M.S. Biology
	Kresha Jones	GSU	B.A. Geology
	Chester Jackson	UNC-W	M.S. Geology
	Crystal Wilson	State U.-W. Ga.	B.S. Geology
	Jaime Gibson	State U.-W. Ga.	B.S. Geology
	Stephen Barrett	State U.-W. Ga.	B.S. Environmental Studies
	Thomas Boothe	State U.-W. Ga.	B.S. Geology
R/A-30	Heidi Atwood	Clemson	B.S. Toxicology
	Robert Grant	Charleston	M.S. Marine Biology
R/A-33	Jennifer Clark	U of Florida	B.S. Agricultural Economics
	Will Dillsaver	Oklahoma State	B.S. Wildlife Sciences
	Marina Nimrod	Savannah State	B.S. Marine Sciences
R/CE-5	Fairlight Fehrenbacher	Georgia Tech	M.S. Civil/Environmental Eng.

	Jiamou Chen	USC	PhD Geological Sciences
R/CE-6	Amanda Blackwell	Clemson	B.S. Civil Engineering
	Martin Bowen	Clemson	B.S. Civil Engineering
	Adam D'Alessandro	Clemson	B.S. Civil Engineering
	Bryan Dick	Clemson	B.S. Civil Engineering
	Alvin Galloway	Clemson	B.S. Civil Engineering
	Cos Gardner	Clemson	B.S. Civil Engineering
	Steven Hardee	Clemson	B.S. Civil Engineering
	Christian Horton	Clemson	B.S. Civil Engineering
	Viet Huynh	Clemson	B.S. Civil Engineering
	Jonathan Lamb	Clemson	B.S. Civil Engineering
	Tara Pagano	Clemson	B.S. Civil Engineering
	Warren Rholoff	Clemson	B.S. Civil Engineering
	Mary K. Phillips	Clemson	M.S. Civil Engineering
	William DeLoach	Clemson	M.S. Civil Engineering
	Charles Atkins	Clemson	M.S. Civil Engineering
	Deepa Kulkarni	Clemson	M.S. Civil Engineering
	Matt McCann	Clemson	M.S. Civil Engineering
R/COP-7	Aleck Zwang	Georgia	PhD Marine Sciences
	Jeff Kauffman	USC	M.S. Earth/Env. Res. Mgmt.
	Frank Nemeth	USC	M.S. Env. Health Sciences
	Trent McKenzie	USC	M.S. Civil/Env. Engineering
	Rosalynn Lee	UGA	PhD Marine Sciences
	Bill Porubsky	UGA	PhD Marine Sciences
	Nathaniel Weston	UGA	PhD Marine Sciences
	Liliana Velasquez	UGA	M.S. Marine Sciences
	Sarah Fischer	UGA	B.S. Marine Sciences
	Anika Mahoney	UGA	B.S. Marine Sciences
	Tiffany Roberts	UGA	B.S. Marine Sciences
	Ma Hongbo	USC	PhD Env. Health Sciences
	Adam Bode		B.S. Marine Sciences
	Ian Conboy		B.S. Marine Sciences
	Tiffiani Joy Miller		B.S. Biology/Chemistry
	Davd Gillett	Charleston	M.S. Marine Biology
	Chris Gawle	Charleston	M.S. Marine Biology
	Paolo Calle	USC	PhD Marine Biology
	Michele Lueck	USC	B.S. Marine Science
	Tawnya Cary	USC	M.S. Biology
	David Block	USC	PhD Env. Health Sciences
	Karina Grosso	USC	M.S Env. Health Sciences
	Adriana Bejarano	USC	PhD Env. Health Sciences
	Samuel Walker	USC	M.S. Env. Health Sciences
	Cameron Kerr	USC	M.S. Env. Health Sciences
	Heath Kelsey	USC	PhD Env. Health Sciences
	Amy Zion	USC	B.S. Marine Science
	Jill Stewart	UNC-CH	PhD Public Health
	Robin Puett	USC	PhD Env. Health Sciences
	Robin Adams	Charleston	M.S. Env. Studies
R/ER-20	Xiao Huang	USC	PhD Ecology
	Purwasto Saroprayogi	USC	M.S. Earth/Env. Res. Mgmt.
R/ER-21	Tawnya Cary	USC	M.S. Biology
R/ER-22	Chris Hintz	USC	PhD Marine Sciences

R/ER-23	Brian Shiels	USC	B.S. Chemistry
R/MT-5	KJ Oswald	USC	PhD Biology
	CJ Anderson	USC	PhD Biology
R/MT-6	Javier Robalino	MUSC	PhD Biochemistry
	Adrian Grimes	MUSC	PhD Biochemistry
	Ann Chen	MUSC	PhD Biometry

Attachment #7. S.C. Sea Grant Consortium STUDENTS SUPPORTED BY SEA GRANT AND NOAA FELLOWSHIPS 1984-2002

Dean John A. Knauss Marine Policy Fellowship (National Sea Grant College Program)

Year Class	Name	Institution	Degree
1984	David Pyoas	CofC	M.A. Public Administration
1986	Stephanie Sanzone	USC	M.S. Marine Science
1989	Grant Cunningham	Clemson	Ph.D. Parks, Recreation and Tourism Management
1989	Paul Scholz	USC	M.S. Marine Science
1990	Frances Eargle	USC	M.S. Biology
1991	Edward Cyr	USC	Ph.D. Marine Science
1992	Wendy Whitlock	Clemson	M.S. Parks, Recreation and Tourism Management
1993	Erik Zobrist	USC	Ph.D. Biology
1993	Jenny Plummer	Clemson	M.A. City and Regional Planning
1994	Ellen Hawes	CofC	M.A. Public Administration
1996	Lisa DiPinto	USC	Ph.D. Marine Science
1998	Mara Hogan	CofC/MUSC	M.S. Environmental Policy
1999	Elizabeth Day	USC	Ph.D. Marine Science
1999	Robyn Wingrove	CofC	M.S. Marine Biology
2000	Barbara Bach	USC	M.S. Earth and Environmental Resources
2001	Julianna Weir	USC	M.S. Marine Science
2002	Kathy Tedesco	USC	Ph.D. Geological Sciences
2002	Elizabeth Fairey	CofC	M.S. Environmental Policy
2003	Jennifer Jefferies	CofC	M.S. Marine Biology
2004	Susannah Sheldon	CofC	M.S. Environmental Studies
2004	Rebecca Shuford	USC	Ph.D. Marine Science
2004	Noel Turner	CofC	M.S. Marine Biology

Coastal Management Fellowship (NOAA Coastal Services Center)

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Year Class	Name	Institution	Degree
1997	Doug Marcy	UNC-Wilmington	M.S. Geology
1997	Brian Voight	Clemson	M.A. City and Regional Planning
1998	Katherine Busse	Oregon State	M.S. Marine Resource Mgmt
2001	Peter Slovinsky	USC	M.S. Geological Sciences
2001	Bonnie Willis	USC	M.S. Marine Science
2001	Kate Ardizone	Indiana University	M.A. Public Affairs
2002	Susan Fox	CofC	M.S. Environmental Policy

National Sea Grant Industrial Fellowship

Year Class	Name	Institution	Degree
1997	Brian Michot	Clemson	M.S. Civil Engineering

Attachment #8. South Carolina Sea Grant Consortium Partners

(Selection of current and recent partners)

National/Regional

NOAA National Sea Grant College Program

NOAA National Ocean Service

NOAA/NOS Coastal Ocean Program

NOAA/NOS Coastal Services Center

NOAA/NOS Hollings Marine Laboratory

U.S. Army Corps of Engineers

U.S. Coast Guard

Federal Emergency Management Agency

U.S. Geological Survey

U.S. Fish and Wildlife Service

Centers for Disease Control

US Environmental Protection Agency

Atlantic States Marine Fisheries Commission

S. Atlantic Fisheries Management Council

State

SC Department of Natural Resources

SC Department of Health & Environmental Control

SCDHEC - Ocean & Coastal Resources Mgmt.

SC Department of Parks, Recreation & Tourism

SC Emergency Preparedness Division

SC Higher Education Commission

SC Ports Authority

SC Office of the Governor

SC General Assembly - House and Senate

North Inlet/Winyah Bay NERR

ACE Basin NERR

SC Task Force on Harmful Algae

SC Information Resources Council

SC Government Webmasters Association

Water Resources Division - USGS (Columbia)

Local

Eight (8) Coastal County Governments

Waccamaw Council of Governments

Berkeley-Charleston-Dorchester Council of Govts.

Lowcountry Council of Governments

City of Charleston

Town of Kiawah Island

Town of Hilton Head Island

Beaufort County Planning Commission

Hilton Head Island Planning Commission

Town of Bluffton Planning Council

City of Myrtle Beach

Town of Folly Beach

Universities

University of South Carolina

Medical University of South Carolina

Clemson University

South Carolina State University

College of Charleston

Coastal Carolina University

The Citadel

Skidaway Institute of Oceanography

SUNY - Albany

University of Georgia

University of Massachusetts - Dartmouth

Georgia Institute of Technology

University of Texas - El Paso

University of North Carolina - Wilmington

University of New Hampshire

Texas A&M University

North Carolina State University

29 Sea Grant College Programs

NASULGC

CORE

Private

Donlar Corporation

Wyeth-Ayerst

Lockheed Corporation

Swimming Rock Fish & Shrimp Farm

Island Fresh Seafood

Lowcountry Seafood, Inc.

Mayo Clinic, Rochester

South Carolina Aquarium

Duke Power Company

Springs Industries

BMW Manufacturing Corp.

Sunoco Products, Inc.

BP Amoco Chemicals

Great Bay Farms (NH)

Other Organizations

K-12 Schools (coastal South Carolina)

Lowcountry Science Fair

National Ocean Sciences Bowl

SC Marine Educators Association

SC Nature-Based Tourism Association

SC Chamber of Commerce

Chambers of Commerce (coastal)

African-American Heritage Council

113 Calhoun Street Foundation

SC Municipal Association

SC Downtown Development Association

SC Economic Development Council

SC Rural Economic Development Assn.

Lowcountry Institute (Spring Island, SC)

SC Farm Bureau

SC Aquaculture Association

SC Shrimpers Association

SC Seafood Alliance

SC Shellfish Association

SC Crab Workers Association

SC Shrimp Growers Association

SC Aquatic Plant Management Society
Beaufort County Water Quality Task Force
SC Coastal Conservation League
Palmetto Pride
Estuarine Research Federation
Southeastern Estuarine Research Society
Coastal States Organization